The Newspaper of Information Systems Management
January 30, 1995, Vol. 29, No. 5, 116 Pages, $6/Copy, $48/Year

COMPUTERWORLD

EMC recasts RAID

By Craig Stedman

Would RAID by any other name smell as sweet?

EMC Corp. confirmed last week that it will try to answer that question in the third quarter by outfitting its fast-selling Symmetrix mainframe disk arrays with a hybrid version of RAID. The hybrid is the redundant storage technology.

EMC said users will be able to split their Symmetrix boxes into pieces that could be separately configured with the upcoming RAID-S or the disk mirroring and dynamic sparing approaches it already offers.

In addition, sources familiar with the company's plans said both 3380 and 3390 data formats will also eventually be supported in a single array.

Users and analysts

EMC has gone from nowhere to No. 2 in the mainframe disk market in just three years.

EMC, *page 113*

NT Server jumps on PowerPC bandwagon

By Laura DiDio

Microsoft Corp. last week revealed that it is set to beta-test an enhanced version of its Windows NT Server that will add much-anticipated support for the IBM PowerPC server platform, PCMCIA adapters and file compression capabilities.

The forthcoming NT Server 3.51 upgrade will ship to beta sites in the first quarter and may ship in volume during the second quarter, said Mike Nash, Microsoft's group product manager for Windows NT.

One feature that will not be bundled into NT Server 3.51 is support for Novell, Inc.'s NetWare. Instead, the upgrade will support NetWare as a separate option that will be "priced competitively," Nash said.

Users and analysts familiar with the 3.51 release gave its new features a thumbs-up — especially support for the PowerPC platform. The enhancements will bolster Microsoft's already strong presence as a provider of application and database servers, they said.

"Support for the IBM PowerPC ... is really nice," said Randy Dugger, director of information systems at Liposome Technology, Inc., a Menlo Park, Calif., pharmaceuti-

NT Server, *page 113*

OPENDOC:
Cliff Reeves

In Depth

OpenDoc *vs.* OLE/COM

OLE/COM:
Robert Bismuth

OpenDoc supporter Cliff Reeves says OLE/COM has all the technical sophistication of a Neanderthal. Newly shipping OpenDoc can claim to be more elegant, but it hasn't proved anything yet, counters **OLE/COM backer Robert Bismuth**. The two square off beginning on page 86.

Newspaper

Support and maintenance costs

Making the deal

By Kim S. Nash

This does not have to happen to you.

Support costs for the Alberta Cancer Board's four Sybase, Inc. database licenses jumped to $97,000 in 1994, up 45% from its $67,000 bill in 1993.

Two evils lurked behind that $30,000 hike, said Felix Fridman, director of information systems at the Edmonton, Alberta-based health care agency: Sybase changed its support programs, and the agency moved from mainframe computing to Unix and Microsoft Corp.'s Windows NT.

But users in similar situations do not have to bleed money in the form of maintenance payments. In fact, some large sites have found smarter ways to negotiate software support contracts and cut their bills by half or two-thirds. That is a pretty penny, considering that the 1994 Computerworld Premier 100 companies spent an average of 47% of their annual software budgets on maintenance and support.

"Despite what vendors may have you believe, maintenance fees are not written in stone or even mud. Everything's negotiable," said Bill Zeitz, president of Zeitz and Associates, a New York consulting firm.

Indeed, squeezing a better deal out of Oracle Corp., a notorious negotiator, was Zeitz's last

Making the deal, *page 16*

Lotus cut estimated retail prices for Notes and expanded the range of client choices

$100 NOTES EXPRESS
Entry-level Notes client; provides client/server E-mail.

$155 NOTES DESKTOP
New runtime executable for client; runs with any Notes server or application.

$155 AT&T'S NETWORK NOTES*
Expected runtime client for access to an AT&T Network Notes server.

$275 NOTES
Classic Notes; offers full client/server capabilities.

*Lotus has not announced official pricing or positioning for AT&T's Network Notes. Price is based on estimate from International Data Corp. in Framingham, Mass.

Lotus drops prices to build Notes base

By William Brandel

Emboldened by Microsoft Corp.'s delays in delivering its Exchange Server, long touted as a "Notes killer," Lotus Development Corp. last week launched a blitz of price cuts and bundling arrangements. The moves were designed to persuade corporate sites to take Notes beyond the pilot stage.

Perhaps most significant among the announcements was Lotus' capitulation to user demands for a runtime client version of Notes. With an expected street price of $120, the software does not include the application development and administration capabilities found in the full-blown client (see chart above). Lotus also dropped the price of the client/server version of Notes from $330 to $275.

Users now have a choice of pricing options for Notes in addition to a wide range of plat-

Lotus, *page 14*

Info-terrorist threat growing

By Gary H. Anthes
MONTREAL

Your company has state-of-the-art information security programs — virus scanners, data encryption and an Internet firewall.

But what are you doing about HERF guns and EMPT bombs?

High Energy Radio Frequency guns and Electromagnetic Pulse Transformer bombs are devices — akin to microwave ovens — designed to aim electromagnetic radiation at a target. They were among the items on a grim list of devices highlighted at the recent National Computer Security Association's "Information Warfare" conference here.

The majority of information systems managers pay scant attention to the threat of electromagnetic weapons. Indeed, the notion that a company's computers or communications systems are at risk from an info-terrorist toting a portable Star Wars device seems far-fetched to many.

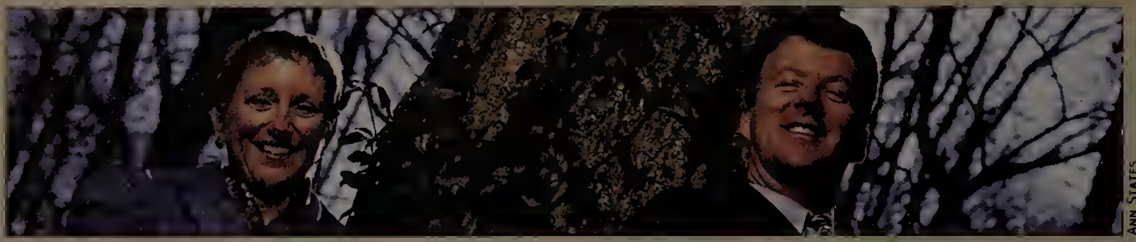
But a growing number of information security experts say it is just a matter of time before a disgruntled employee, extortionist or terrorist zaps megawatts of energy into a hapless data center and turns mission-critical information into digital mush.

Info-terrorists, *page 28*

A PUBLICATION OF IDG

What's Inside

January 30, 1995


ANN STATES

First it was Michael Jackson and Lisa Marie Presley. Now the stress and strain of downsizing, re-engineering and restructuring are turning **HR** and **IS** managers like Georgia-Pacific's Gwen Barker and Rick Partridge into...

Unlikely Allies

See MANAGEMENT, PAGE 69

NEWS

- **Cincom** drops plans for a distributed version of its Supra database in favor of an object/relational hybrid. *Page 4*
- **Compaq** had a record year in the market, but for Wall Street, just being No. 1 isn't good enough. *Page 6*
- The judge reviewing the **Microsoft antitrust** case isn't about to use a rubber stamp. *Page 6*
- Microsoft plans to pair releases of desktop **Windows** and Windows NT in 1996. *Page 7*
- Silicon Graphics announces an all-in-one Internet **document-authoring** system. *Page 10*

DESKTOP COMPUTING

- The response is muted for **Intel's Pentium** upgrade. *Page 41*

WORKGROUP COMPUTING

- Products based on Lotus' Notes integrate **E-mail and voice-mail** services. *Page 47*

ENTERPRISE NETWORKING

- Cisco promotes a standard allowing **internetworking products** to share configuration information. *Page 51*

LARGE SYSTEMS

- IBM's new **sales** organization was met with applause from customers who hope the computer giant will get to know their businesses better. *Page 57*

APPLICATION DEVELOPMENT

- High-end **client/server tools** vendors take note of Microsoft's Visual Basic users. *Page 63*

How do you measure up?

How does your IS department compare with the Computerworld Premier 100? Fill out the Premier 100 survey, and we'll send you a free report showing how your operation compares with Premier 100 averages. Consolidated information from the surveys we collect may be published in a future Premier 100 issue. Send a request on company letterhead to Paul Gillin, Editor, Computerworld, 375 Cochituate Road, Framingham, Mass. 01701 or E-mail to survey@cw.com.

MANAGEMENT

- An **IS executive** tells why she still likes computers better than her business colleagues. *Page 72*

CAREERS

- A **mainframe programmer** quiets his fears and steps into Windows development. *Page 91*

COMMENTARY

- **Charles Babcock** says don't discount or discard the mainframe too early. *Page 8*
- **Paul Gillin** advises readers not to overlook all the good things Borland has done. *Page 36*
- **Michael Cohn** offers a test for CIOs to determine whether they should look for a raise or their resumes. *Page 37*
- **Esther Dyson** says partners in virtual corporations must effectively share information. *Page 37*

RAID goes RADICAL

Once a fail-safe alternative for a small part of a company's critical data, RAID devices are overtaking traditional storage systems at all levels. For user analysis of the choices in large system, midrange and server RAID devices, see the CW Guide to RAID Storage Devices, page 77, and Marketplace, page 102.

Calendar....................................Page 72
Company Index ....Page 110
Editorial/Letters to the editor ....Page 36
Jan. 27 Stock Ticker.....................Page 111
How to contact Computerworld ... Page 114

Executive Briefing

Users don't have to bleed money for software maintenance costs if they muscle vendors into signing more flexible support contracts. Some large sites have found **smarter ways to negotiate** software support contracts and cut their bills by half or two-thirds. *Page 1*

Information warfare specialists warn that risks from info-assassins are growing. Devices such as HERF guns were among a grim list of computer-disabling devices highlighted at a recent computer security conference. Experts say the majority of IS **managers pay scant attention** to such threats from electromagnetic weapons. *Page 1.* Meanwhile, two new breaches on the Internet highlight the need for **tighter security.** *Page 12*

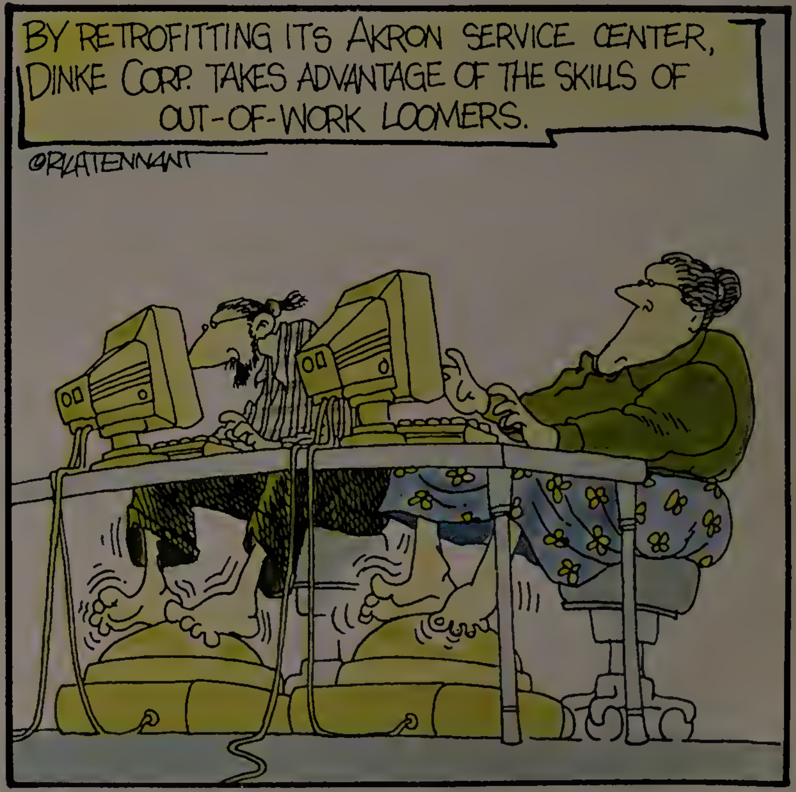
Lotus slashes prices in an effort to persuade corporate sites to take Notes from product pilot to groupware standard. **One of the most** significant moves by Lotus was its capitulation to user demands for a runtime client version for Notes. That client package is expected to carry a street price of $120. *Page 1*

Computer Associates' Chairman and CEO Charles B. Wang says his company has **shifted its focus** from pure sales to maintaining relationships with customers. *Page 16*

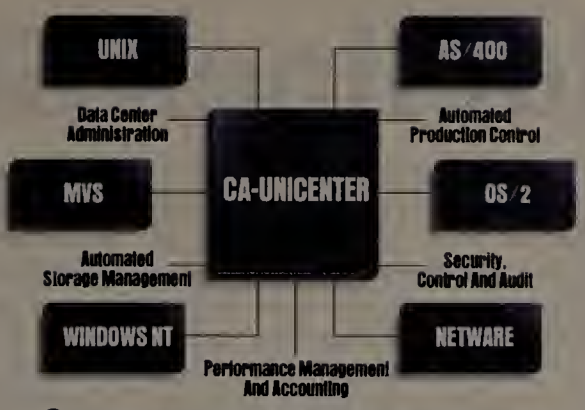
The meshing of Mobil Research & Development's business and technology directives — through which Mobil links its R&D strategy with its customers' plans — is one example of how organizations can better leverage their technology investments, as shown at a recent gathering of **The Conference Board.** *Page 24*

On site this week: When **Texas Commerce Bank** added a new 401K business unit, **workflow** was at the heart of the system design. *Page 47.* Videoconferencing is key to **Modern Engineering**'s becoming a worldwide supplier of automotive engineering services. *Page 32.* Medical products company **The Darby Group** rearchitected its IS operation, trimming down its mainframe complex while boosting PC and LAN use. *Page 42.* **Ogden Projects** has been energized by an AS/400-based imaging system. *Page 57*

The 5th Wave *by* Rich Tennant


BY RETROFITTING ITS AKRON SERVICE CENTER, DINKE CORP. TAKES ADVANTAGE OF THE SKILLS OF OUT-OF-WORK LOOMERS.
©RICHTENNANT

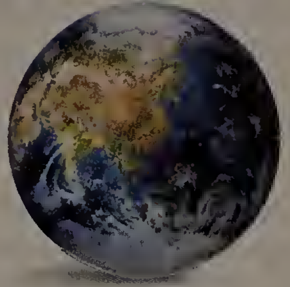
1. Standardise On A Common GUI Interface That Makes It Easier To Use, Reduce Training Costs And Boost Productivity.


UNIX
AS/400
Data Center Administration
Automated Production Control
MVS
CA-UNICENTER
OS/2
Automated Storage Management
Security, Control And Audit
WINDOWS NT
NETWARE
Performance Management And Accounting

3. Choose A Client/Server Application That's Interoperable, Scalable and Portable.

4. Demand An Open Solution That Supports All Key Industry Standards And Protocols.

2. Protect All Your Data With Bulletproof Security Software That Supports Every Platform And Operating System Across Your Entire Enterprise.



5. Partner With The World's Leading Software Company.

6. Leverage Your Systems Management Experience, Expertise And Personnel.

7. Replace Disparate Point Products With A Single, Integrated, Comprehensive Solution.

Presenting The 7 Commandments Of Systems Management Software.

CA World '95
July 16-21, 1995
New Orleans.
Call 1-800-CA-INFO95
for information.

When choosing your systems management software, you shouldn't have to make a leap of faith. And with new CA-Unicenter,® you don't have to. Because CA-Unicenter is the single, integrated systems management solution that solves all of the challenges of managing client/server computing across heterogeneous platforms.

So call today for more information about the systems management software you can believe in: CA-Unicenter.

Call 1-800-225-5224, Dept. 10102
For More Information And
To Register For The CA-Unicenter
Software Giveaway.

CA-Unicenter®

Integrated Client/Server Systems Management Software

COMPUTER ASSOCIATES
Software superior by design.

© Computer Associates International, Inc., Islandia, NY 11788-7000. Offer good in U.S. and Canada only. All other product names referenced herein are trademarks of their respective companies. Requirements for Software Giveaway available through toll free number.

Cincom sidelines Supra database

By Rosemary Cafasso and Craig Stedman

Cincom Systems, Inc. is saying hello to object database technology and goodbye to the long-delayed distributed version of its Supra Server relational database. And some Supra users are wondering what to say in return.

Marco Emrich, senior director of the advanced technology group at Cincom, confirmed last week that the Cincinnati-based company has dropped plans to market Supra Server Version 3.0, except to the federal government. Instead, it is substituting an object/relational hybrid based on technology from Unisql, Inc. in Austin, Texas. The hybrid, referred to internally as the Total Object Hub, entered production this month, according to Emrich.

Even the government release of Supra 3.0, which was renamed Supra 127 when it shipped last September, will be replaced after Cincom adds support for the Federal Information Processing Standard 127 specifications to the Unisql-based product, Emrich said. He did not say when that will occur.

Supra 3.0 was originally due in 1992 (see box), but Cincom ran into engineering and testing delays and eventually revisited its strategy, Emrich said. Acknowledging its bit presence in the Unix database market, the company switched to the Unisql technology because it can work in environments with databases from multiple vendors, he added. Supra 3.0, on the other hand, would have required customers to standardize on that product at all sites.

In the dark

Yet several Cincom customers who were looking forward to the distributed capabilities that Supra 3.0 was supposed to provide — such as protected two-phase commit and access to data tables at different sites — said the new object-based approach remains a bit of a mystery.

"I can't comment on a strategy that hasn't been articulated," said David Sacco, MIS manager at the rolled products division of Alcan Aluminum Corp. in Cleveland. Cincom has not laid out a clear migration path from Supra Server 2.x to the Unisql-based product, and Alcan is "impatient and actively pursuing other alternatives" for future database purchases, he added.

"It looked like they had a good thing going" with Supra 3.0, said Craig Lincoln, manager of information services at Star Cutter Co., a maker of metal cutting and drilling tools in Farmington Hills, Mich. Total Object Hub has potentially long-term interest for Star Cutter, but object technology as a whole "is still a very general concept in our minds," he said.

Samuel Smith Jr., senior engineering programmer/analyst at the Sonoma County Water Agency in Santa Rosa, Calif., said it is also taking a cautious approach to objects. "We're still waiting to see how it all shakes out, not just at Cincom but in the industry," he said.

While Supra 3.0 has been jettisoned, the older Supra 2.x will continue to be enhanced, Emrich said. A Supra 2.7 release is due in May with disk striping and performance monitoring features.

The perils of Supra Server 3.0

June 1992	Promised introduction in October 1992
November 1992	Introduction delayed until March 1993
May 1993	Delivery promised in fourth quarter of 1993
September 1994	Shipped for government users only
January 1995	Object/relational database hybrid released as replacement for Supra

Peter Storer, an analyst at Atre Associates, Inc. in Port Chester, N.Y., said Supra 3.0 was Cincom's great hope for competing with the heavyweights of the Unix database world. "They had some really slick technology in there," he said. "It's a shame to see that go away."

However, Richard Finklestein, president of Performance Computing, Inc. in Chicago, noted that the distributed approach of Supra 3.0 was superseded by technology for replicating central databases to remote sites.

Corrections

Due to an editing error, the Dec. 19, 1994, "Guide to Business Intelligence Software" incorrectly cited Information Resources, Inc. as the vendor of Express. The product is now sold by IRI Software, a separate company.

Due to a reporting error in the Sept. 12, 1994, issue, Online 10Base-T Security Module was incorrectly listed as being produced by 3Com Corp. The product is produced by Chipcom Corp.

In the story "IBM's kernel pops" [CW, Jan. 9], David Pinkard, a technical analyst at Mallinckrodt Medical, Inc., was erroneously identified as David Mallinckrodt.

Racotek offers wireless 'Key'

Environment allows transparent messaging across incompatible networks

By Michael Fitzgerald

Valentine's Day should mark a major breakthrough for corporate IS managers who have been flirting with the concept of deploying wireless data services.

That is when Racotek, Inc. in Minneapolis will announce KeyWare, a messaging environment that appears to hand information systems managers a wireless bouquet.

KeyWare will provide a common application programming interface (API) designed to let users send messages transparently over incompatible networks, sources close to the company said. Racotek will announce the product at Networks Expo Boston on Feb. 14-16, the sources said.

According to today's issue of Andrew Seybold's "Outlook on Computing and Communications," a newsletter in Brookdale, Calif., KeyWare is "an open, scalable Wireless Distributed Computing environment" similar to the Distributed Computing Environment.

KeyWare supports Cellular Digital Packet Data (CDPD), Ram Mobile Data USA, L.P.'s Mobitex network and Ardis Co.'s Advanced Radio Data Information Services (ARDIS) network. It also supports circuit-switched cellular networks. Using a feature that sources called CellSmart, it can decide on a case-by-case basis whether circuit-switched or CDPD is the best mode to transfer data.

This array of network support means KeyWare will bring elements of the wired telephone system to the wireless market. Just as a telephone user can make calls without knowing that the country's phone network is made up of disparate long-distance and local networks, KeyWare will help ensure that a CDPD user can send data to an ARDIS user without having to think about it.

No question

Andrew Seybold, editor of the "Outlook" newsletter, wrote that "there will probably never be one single carrier that will be able to provide coverage sufficient to satisfy most companies. This ability, coupled with wired access, makes the Racotek system an important addition to wireless mobile computing."

This means that corporate users trying to decide which network to pick, despite the drawbacks of each, can now simply modify their code to a designated Racotek host server.

"We'd be interested in something like that," said Jeffrey Kreafle, manager of network management at PECO Energy Co. in Philadelphia. PECO, a large utility, has its own private radio network but is looking into a variety of other wireless formats. The need to rewrite applications has helped slow this move, Kreafle said, adding that a product such as KeyWare might encourage PECO to deploy more wireless services faster.

"Assuming that [Racotek's] list of facilities was a) stable, b) usable and c) price-competitive, then that would be very interesting to us," said John Chapman, a senior technology consultant at Amoco Corp. in Chicago.

"We were impressed by" KeyWare, said Virginia Brooks, an analyst at the Aberdeen Group in Boston. "They've got something here, if the product can do what they say it's going to do." Brooks was briefed by Racotek on the product and said it is code-named Crystal.

KeyWare is expected to ship in late March, the sources said, at which time Racotek will announce partnerships with systems integrators such as Electronic Data Systems Corp., Andersen Consulting and SHL Systemhouse, Inc.

RACOTEK'S KEYWARE CAN SUPPORT MESSAGE PRIORITIZATION AND HANDLE MESSAGES OF UP TO 8K BYTES IN LENGTH. IT FEATURES A RECOVERY PROVISION TO REESTABLISH NETWORK LINKS FOR MOBILE USERS AND ALSO HAS THE FOLLOWING SERVICES:

Naming	Identifies users, applications and devices on a network.
Message	Allows users to exchange different data types. Has reliability features such as end-to-end acknowledgment and store-and-forward data delivery.
Time	Allows for synchronized clocks on network devices, which improves scheduling and sequencing for mobile users.
Optimal delivery	Gauges wide-area network availability.
Network management	Provides troubleshooting utilities, performance analysis and routine network management data.

Source: Andrew Seybold's "Outlook on Communications and Computing," Brookdale, Calif.

Such partnerships would be good news to users, who have consistently complained that they have to do their own integration to deploy wireless networks. That is a daunting task for all but large corporations with mission-critical needs, such as United Parcel Service, Inc., to the degree that most corporations have avoided implementing wireless technology.

"The user has to be to some degree an integrator" to install a wireless wide-area network, said David L. Lyon, president of Pacific Communication Sciences, Inc. in San Diego.

You're going to live with your client/server applications for years. Careful who you choose.

Getting hitched with client/server applications can be years of misery. Or a complete joy. It all depends who you choose as your partner.

Information Accessible By All Departments

With Oracle Cooperative Applications, you can be assured of a long and prosperous relationship.

In fact, more than 1,700 customers in over 50 countries are using OCA. That's because OCA offers the broadest set of integrated modules to support commercial or government finance, manufacturing and supply, distribution, sales and service, and human resources management. And each one has been designed to improve access to data and enable better business processes, resulting in improved customer service.

Oracle's Cooperative Applications also have the fastest implementation in the industry to maximize your ROI.

Radius®, a leading manufacturer of desktop digital video and publishing products, actually implemented new financial, HR, and manufacturing applications in a mere eight months.

Global Integration

Oracle supports all major graphical user interfaces and terminals so each user can work within their familiar environment, which leverages existing equipment and reduces training cost.

Leverage Legacy Information

Additionally, Oracle's gateways allow your new applications to access legacy data so you can replace old systems at your convenience.

Faster Conversion Saves Money

The architecture of OCA enables international functionality so localized business practices can be accommodated while still maintaining enterprise-wide data integrity. And Oracle supports 22 languages and has 50 Global Business Centers providing worldwide resources, consulting and product support to ensure your success.

Familiar Environments For Users' Access

Long term compatibility requires long term flexibility. And nothing gives you more options than Oracle Cooperative Applications.

If you're still not convinced we're a match made in heaven, give us a call and we'll send you our free video.
Call 1-800-633-1071 Ext. 8173.

ORACLE®

Compaq takes market hit despite growth

By Jaikumar Vijayan

In what some industry analysts described as a startling reaction to one of the PC industry's better report cards, Compaq Computer Corp.'s stock took a battering early last week, soon after the company announced record fourth-quarter and 1994 year-end results.

Shares tumbled by as much as 12% last Wednesday after the Houston-based firm announced record earnings of $867 million on revenue of $10.4 billion for 1994.

That response — which some analysts called an overreaction — could have been prompted by inflated Wall Street expectations of Compaq, as well as concerns over first-quarter earnings after Compaq warned of a "relatively flat" period just ahead.

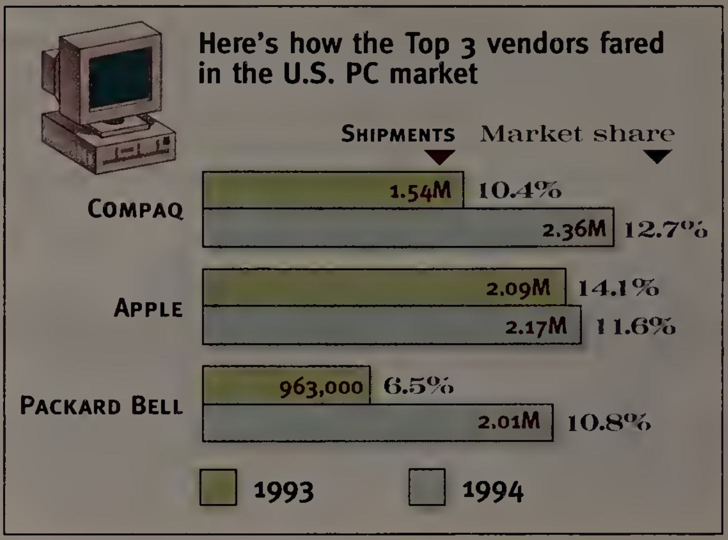
The market's caustic reaction speaks to fears about Compaq's performance in 1995. In fact, it could prove to be a cautionary sign for the desktop giant, analysts said, because Compaq still faces a number of potentially serious problems in the short term, including the following:

- A complete product transition in the first quarter that could result in weak sales as customers wait for new products.
- Continued problems with a rapidly aging portable computer line that has already cost the company its leadership position in the mobile market [CW, Jan. 23].
- A seriously backlogged inventory that was substantially reduced in the last quarter but still exceeds $2 billion.
- A weak Pentium presence that has helped vendors such as Dell Computer Corp. and Gateway 2000, Inc. to the top of the small but growing market segment of corporate Pentium buyers.

Compaq disagrees

Compaq maintains that most of these are temporary problems, if indeed problems at all.

For example, the company's next round of product introductions, slated for later this quarter, will launch a number of Pentium-class desktop PCs and servers based on Intel Corp.'s Pentium and Advanced Micro Devices, Inc.'s next-generation K5 chips. Those products will include notebooks and PCs for the home market.



Source: Dataquest, Inc., San Jose, Calif.

Trickle down

Compaq's forecasts of a tough first quarter sent down the stocks of some other PC makers, too. Among those affected were AST Research, Inc., IBM, Dell Computer Corp. and Gateway 2000, Inc.

Analysts, however, speculated last week that news of Compaq's impending product updates could substantially limit demand as customers hold out for better products and prices.

But Compaq's seeming lethargy in the booming portables market is causing some real concern.

For instance, rivals such as Toshiba America Information Systems, Inc., IBM and a rapidly reemerging Dell Computer Corp. have begun to announce portables with market-winning features, such as 10.4-in. screens, CD-ROM drives and business audio capabilities. These features are still lacking in Compaq boxes, said Ted Julian, editor of "The Grey Sheet," a newsletter published by International Data Corp. in Framingham, Mass.

Compaq said its current inventory is mostly spare parts and components. Finished goods inventories were pared down significantly in the last quarter, the company said.

One concern analysts have expressed is that excess inventory could lead to a situation similar to the one IBM faced last year when it was stuck with thousands of unsold ValuePoint systems. It eventually auctioned them off.

On the plus side for users is the fact that Compaq's climb to the top of the PC market and its attempts to consolidate its position there could lead to some intense price wars among top-tier vendors, especially in the mushrooming PC server arena, analysts said.

Judge probes deeper into Microsoft antitrust case

Sporkin described as brilliant, energetic by observers

By Mitch Betts and Stuart J. Johnston
WASHINGTON

Analysis

Microsoft Corp. and the U.S. Department of Justice had hoped for quick and easy court approval of their proposed antitrust settlement. Instead, they got U.S. District Court Judge Stanley Sporkin, who is viewing the case as anything but routine.

Conventional wisdom holds that antitrust settlements are usually rubber-stamped. But an inquisitive Sporkin has taken an intense interest in Microsoft's business practices — to the point of suggesting his own set of remedies for charges that appear not in the government's brief but in a book he read over summer recess [CW, Jan. 16].

"I got too involved in this case," Sporkin said at the Jan. 20 public hearing [CW, Jan. 23]. "There are certain things that are gnawing at me."

Several lawyers familiar with Sporkin described him as a "brilliant tiger" and a thoughtful and activist judge who is adamant about making a well-informed decision. That is why he decided to hold the contentious public hearing and to allow anonymous Microsoft rivals to file late comments attacking the proposed settlement.

"He is a very energetic judge who will make up his own mind. He was known as an activist at the Securities and Exchange Commission, and he hasn't become shy and retiring since then," said Stephen Caulkins, a law professor at Wayne State University in Detroit.

A former enforcement director at the SEC and general counsel at the Central Intelligence Agency, Sporkin was appointed to the bench in 1986 by President Ronald Reagan.

Sporkin's approach to the Microsoft antitrust case is colored by his experience at the SEC, where he prosecuted cases charging companies with misleading the public or failing to disclose important information. In the Microsoft case, he appears to be particularly concerned about charges that Microsoft misleads rivals about new products and withholds information about its market-dominating Windows product line from competitors.

After 20 years investigating white-collar crime, Sporkin also likes to find the "smoking gun." So when he came across internal memoranda that purportedly show that Microsoft makes vaporware announcements to freeze the market, Sporkin called them "conspiratorial documents" worthy of more investigation.

Gates groans

However, Microsoft Chairman and Chief Executive Officer Bill Gates last week lashed out at Sporkin for fundamentally misunderstanding the nature of the software industry.

"He might as well accuse Jack and the Beanstalk of doing awful things. He can't understand that when you announce a product in advance, it's only questionable if you do it knowing that it's false. Yes, we announced QB3 [Quick Basic 3.0, a preannouncement Sporkin characterized as a 'smoking gun'] in advance, but ... everything about it was totally true," Gates said.

Judge Stanley Sporkin *takes unconventional approach*

Monopoly?

The Maverick Computer & Communications Industry Association in Washington filed a last-minute brief saying it is concerned the proposed antitrust settlement with Microsoft will still allow the monopolist to offer volume discounts for its operating system. The association also worried that Microsoft will "leverage" its market power in operating systems to dominate the application market.

Gates described the three-phase investigation — explored first by the Federal Trade Commission, then by the Justice Department and now by Sporkin — as "unique in American jurisprudence." He also attacked Gary L. Reback, the lawyer representing three unnamed Microsoft competitors challenging the consent decree and Microsoft's proposed acquisition of Intuit, Inc.

Guessing game

"We have a lawyer in the courtroom that nobody even knows who he represents," Gates said. Asked whom he suspects Reback represents, Gates said, "America Online and Oracle would be my two best guesses. Maybe Borland. Definitely not Novell. I don't think Lotus, but possibly. Who else would it be?"

The Justice Department also objected strenuously to Sporkin's approach. Anne K. Bingaman, head of the department's Antitrust Division, called it "outrageous" to allow eleventh-hour comments by Reback's clients and a separate filing by the Washington-based Computer & Communications Industry Association.

Bingaman further argued that it is improper for the judge to second-guess the department's decision on what charges to file. "I'm the prosecutor. You're the judge," she lectured.

Speculation has now arisen that Sporkin's unconventional approach might cause any decision he makes to be overturned on appeal. Noting Bingaman's charge that Sporkin is second-guessing the Justice Department, one independent lawyer said: "She's right. He's out of bounds."

Microsoft to align Cairo, Windows 95

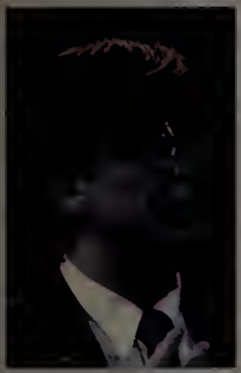
By Stuart J. Johnston

■ When Microsoft Corp. ships its Cairo update to Windows NT next year, it will also ship an update to Windows 95 that enables the client to tightly integrate with the server operating system, said Chairman and Chief Executive Officer Bill Gates last week.

In fact, once Cairo ships, the company plans to release upgrades to both platforms simultaneously from then on.

"The benefit to customers of having the low-end version [of Windows] and the high-end version [of Windows NT] justifies us going to a lot of hard work to keep those things in sync," Gates said.

"Over time, we've got to get the two release dates lined up, so when we come out with Cairo, we will do a modest release of the desktop version to line up with [it]. And [from] that point forward, we'll do releases at the same time," he said.



Next week's issue of *Computerworld* will feature an exclusive interview with Microsoft Chairman Bill Gates (above) as part of an in-depth special report on the software behemoth and its strategies for tackling the enterprise.

Cairo adds an Object File System (OFS), distributed network support for the Object Linking and Embedding technology and the Windows 95 user interface to the Windows NT 3.5 kernel.

The addition of OFS will enable users to search for information on local machines and across a network based on a wide variety of criteria.

While there will not be any significant changes to the Windows 95 user interface, changes are necessary to give users access to Cairo's advanced features, Gates said.

A good threat

Two industry analysts said Microsoft's evolving client/server strategy is good for customers as well as a threat to the company's operating system competitors, particularly IBM and Novell, Inc.

"By Microsoft having both ends of this, they can have better synergism between the desktop and the server," said Rob Enderle, a senior industry analyst at Dataquest, Inc. in San Jose, Calif. 'It really looks like they know what they're doing, and with the lack of a cohesive counter strategy from their competitors — I mean Novell, IBM and Oracle — it's looking more like a Microsoft world."

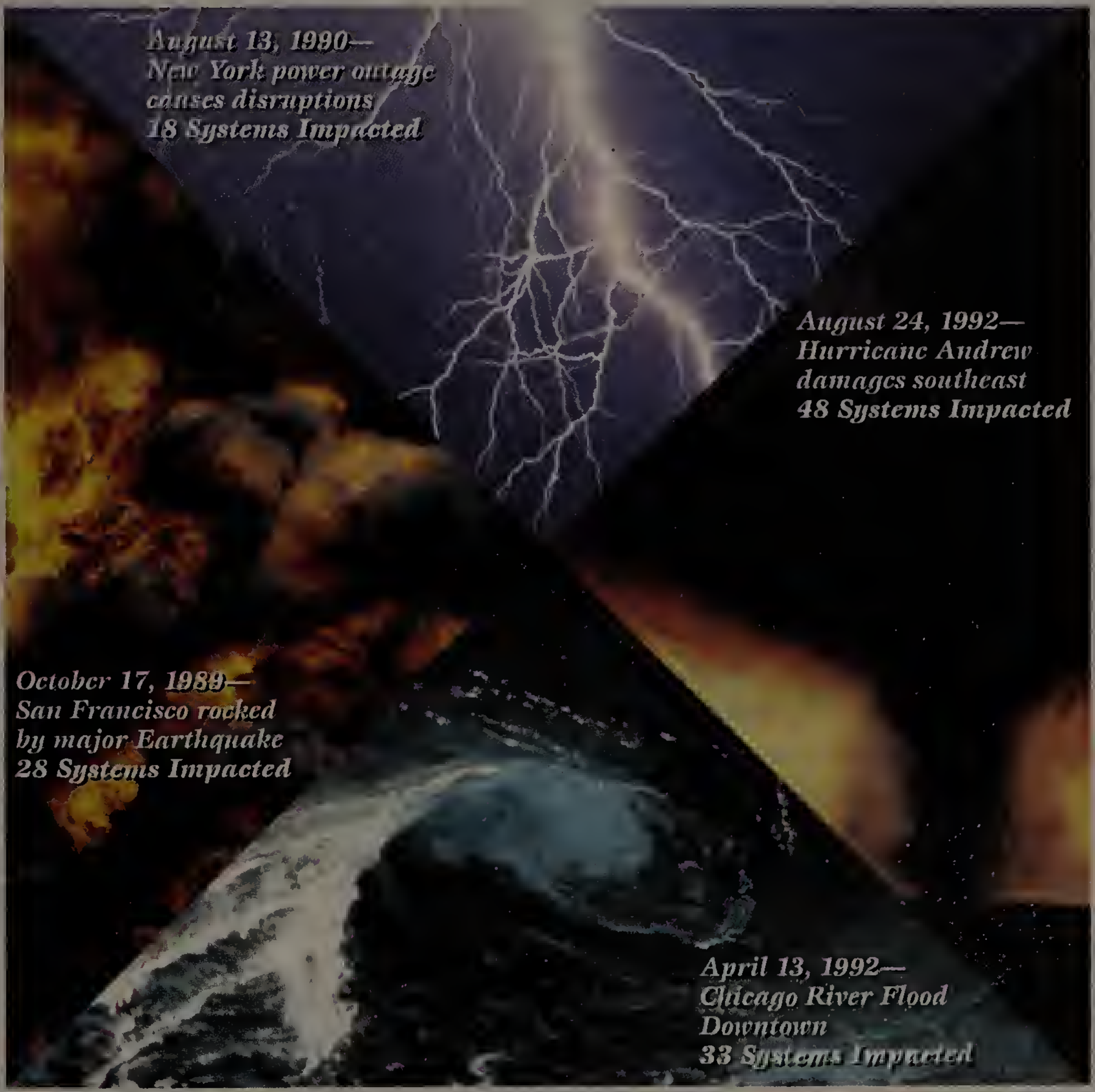
Microsoft has "been getting a lot of pressure to synchronize the two [systems, and] I think Bill has been hearing that from customers really loud," said Jesse Berst, editorial director of the industry newsletter "Windows Watcher" in Redmond, Wash.

Berst and Enderle see the synchronization of desktop and server system releases as a first step toward their unification into a single operating system code base several years from now.

"They've said for a long time that they want to merge the two code bases," Berst said. "They're currently predicting that the desktop hardware will be capable [enough to allow the merger] in 1997 or 1998. Then you'll have a common desktop and server" system.

Additionally, Microsoft is pushing to make sure it meets its latest schedule for Windows 95, a schedule Gates said the company can meet.

He said users will be able to judge whether or not Windows 95 will be available for sale in August by whether the company begins its so-called preview program on time in March. The preview program will sell prerelease versions of Windows 95 to as many as 400,000 users for about $30, a price intended to cover the cost of manufacturing and shipping the disks to users.


August 13, 1990—
New York power outage causes disruptions
18 Systems Impacted
August 24, 1992—
Hurricane Andrew damages southeast
48 Systems Impacted
October 17, 1989—
San Francisco rocked by major Earthquake
28 Systems Impacted
April 13, 1992—
Chicago River Flood Downtown
33 Systems Impacted

PREVENT A REAL DISASTER...
DON'T LOSE CRITICAL DATA

FDR with **FASTCPK, FDRREORG, FDREPORT** and **ABR** are the proven resources most MVS users rely on. From the fury of Hurricane Andrew, surging Midwest floodwaters, World Trade Center bombing to the California earthquakes, Innovation product users were able to attain "business as usual" conditions faster and more completely than those using other products.

Find out why 5,000+ users rely on Innovation's FDR products to provide the best and least costly solution for their storage management needs.

Call for a FREE No-Obligation 90-Day Trial
Available for all MVS Operating Systems

For the Safest DASD Storage—It's critical you rely on...

INNOVATION® DATA PROCESSING

CORPORATE HEADQUARTERS: 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300

EUROPEAN OFFICES: FRANCE 01-47-69-15-15 | GERMANY 089-489-0310 | NETHERLANDS 036-534-1660 | UNITED KINGDOM 0181-905-1266 | NORDIC COUNTRIES +31-36-534-1660

Mainframe users: Don't touch that plug

Those who counted on the unconditional demise of the mainframe should visit Howard Hunter, manager of Occidental Petroleum's telecommunications and computing facility in Tulsa, Okla.

Three of the company's four divisions have shifted to client/server computing with Unix servers and PC/workstation clients. But the largest division, Occidental Chemical, has shunned client/server in favor of adding new applications to Occidental's two Amdahl mainframes.

"Our chemical plant operations depend on the reliability of big iron," says Hunter, citing a mainframe virtue that got lost in the rush to client/server nirvana. Environmental monitoring, process management, and materials and supplies inventory will remain mainframe-based applications at Occidental for the foreseeable future. And Hunter is being forced to buy another mainframe to replace one or both of his existing 100-MIPS Amdahl 5995s. "We'll need 250 to 260 mainframe MIPS by the end of the year," he said.

Hunter's position is not unusual, according to figures on mainframe sales. Annex Research in Phoenix reports that the total number of mainframe MIPS shipped by IBM and plug-compatible suppliers climbed steadily to a peak of 135,000 MIPS in 1991 and then dropped to 115,000 by the end of 1993. With millions of PCs and servers being installed, it appeared as if mainframe MIPS were heading for a permanent retreat.

But last year, the decline reversed itself. Mainframe MIPS sales leaped up 39% to 160,000 in 1994 and will reach an estimated 180,000 MIPS in 1995, says Bob Djurdjevic, president of Annex Research.

The Meta View

The mainframe will clearly be around until the year 2000, and unplugging it prematurely could prove risky.

Charles Babcock

But isn't this reversal temporary? Won't the continued shipment of powerful PCs and microprocessor-based servers eventually undercut big iron's lease on life?

Not exactly. Contrary to predictions, the mainframe will clearly be around until the year 2000, and unplugging it prematurely could prove risky to the IS director's health.

"By having the [mainframes and client/server systems] side by side, we can see the fledgling nature of the Unix servers," Hunter says. "All those tools that we take for granted on the mainframe [performance monitors, systems management, network management] are not available on Unix."

Several vendors have assembled sets of system utilities for Unix systems, including Fourth Dimension, Tivoli, Computer Associates and OpenVision. But, Hunter complains, those tools that are available come from different vendors and don't "interlock."

In the midst of a seemingly unanimous acceptance for client/server elsewhere, Hunter must heed a schism in his own organization, which requires both mainframe services and downsizing. He believes that the demand for mainframe MIPS will level off in 1996 or 1997, and even the chemical division will start moving toward client/server. But he's not 100% sure.

One reason mainframe MIPS reversed their fall and ticked upward in 1994 is that the price per MIPS dropped radically. What was a $112,000 MIPS in 1990 is now a $39,000 MIPS, Djurdjevic says. If the price decline continues, the chemical division will no longer have a financial incentive to migrate to Unix. It might stick with MVS or invoke the IBM option of running Unix on the mainframe.

But the main reason that mainframes are still around is because of their highly engineered reliability. Unlike a PC or Unix workstation, a mainframe running MVS can take a bullet through the heart and, after a slight stutter, resume processing much as before even if a running application blows up and a connected device sends errant signals. A mainframe's many-redundant, self-monitoring, self-correcting features keep it up and running regardless of individual process errors.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

News Shorts

Mass. state agency demands standard Microsoft API

Officials in Massachusetts last week said they are considering boycotting **Microsoft Corp.** products until the software giant makes them more accessible to blind and other visually impaired users. Charles Crawford, head of the state's Commission for the Blind, said he expects to hold talks with Microsoft executives on Wednesday. At issue is the development of a standardized application programming interface (API) that would enable speech synthesis programs to more easily capture graphical information and then represent it verbally to blind users. After heavy lobbying, "Microsoft has indicated they're willing to develop a standard API," Crawford said. "Then again, the proof is in the pudding, and we haven't had a serving yet." Massachusetts now uses "tens of millions" of dollars worth of Microsoft products, Crawford said. At press time, Microsoft was not available for comment.

IBM announces new desktop CICS

IBM introduced several long-expected CICS transaction processing products, including a faster version of CICS for AIX and client software that enables desktop users to connect directly to any CICS server. IBM also plans fourth-quarter delivery of an agent that will enable its mainframe-based CICSPlex System Manager software to monitor and control distributed CICS for OS/2 servers.

Intel networking software debuts

Intel Corp. last week introduced a broad applications suite designed to integrate client/server LAN management functions, including software distribution and metering, hardware and software inventories, performance monitoring and remote control. The LANDesk Management Suite supports only DOS and Windows platforms, but Intel plans support for other operating systems, including Windows NT, OS/2, Unix, Mac OS and Windows 95.

StorageTek deal hits snag

Storage Technology Corp.'s planned acquisition of Minneapolis-based **Network Systems Corp.** may be in jeopardy following a steep drop in the price of StorageTek stock. The decline, which came after StorageTek reported lower-than-expected fourth-quarter profits, left its stock value well below a minimum threshold set in the purchase agreement. Network Systems shareholders will vote on the deal next week.

Apple takes suit to high court

Apple Computer, Inc. has appealed the rejection of its copyright suit against rivals **Microsoft** and **Hewlett-Packard Co.** to the U.S. Supreme Court. Announced Jan. 20, the petition claims the lower courts erred when they rejected Apple's claim by focusing only on individual elements and not taking into account the overall similarity of Microsoft's Windows and HP's NewWave programs to the Macintosh interface.

SEC nixes electronic stock market

The **Securities and Exchange Commission** rejected a proposal by the **NASDAQ** stock exchange to launch a new electronic trading system. The system, called N-Prove, was supposed to allow traders to barter stocks at better prices than they can now. But SEC officials said the system might make it harder for customers to get guaranteed execution at market prices.

Gupta readies data mover

Along with a major upgrade to its SQLBase database, **Gupta Corp.** plans to unveil next month a data mover tool for collecting information stored in non-Gupta databases, the company confirmed last week. SQL Ranger, which is akin to Trinzic Corp.'s InfoPump, will be priced at less than $500 and will support Open Database Connectivity, Gupta said. The product targets users deploying data warehousing applications.

HP extends middleware help

Acknowledging that users are having trouble moving on-line transaction processor applications from mainframes to Unix servers, **Hewlett-Packard** this week will announce a plan to help customers make that transition. HP is setting up an 800 number that users can dial for middleware information. The vendor's Middleware Engineering Initiative will coordinate a wide array of software and middleware products and services from HP and its business partners.

Volunteer school program begins

The Massachusetts Software Council, along with **Computerworld, Inc.** and **Deloitte & Touche**, has formed the Massachusetts Tech Corps to help schools place computer hardware, software and networking technology in the classroom. The volunteer program will begin with 12 pilot school systems and will spread statewide by January 1996. Technology professionals are being solicited for planning, technical support, networking, resource acquisition and classroom instruction.

Cadre adds SGI debugger to suite

Cadre Technologies, Inc. in Providence, R.I., has extended its object-oriented application development tool kit with debugging and analysis features. The company is using technology obtained from **Silicon Graphics, Inc.** in Mountain View, Calif. Cadre has ported the SGI tool set to Sun Microsystems Computer Corp. workstations and will make it available for Hewlett-Packard Unix workstations as well.

SHORT TAKES **Spectrum Information Technologies, Inc.**, which fell under a wart-exposing spotlight after hiring former Apple Computer, Inc. Chairman John Sculley, filed for Chapter 11 bankruptcy protection last week.

51 Issues for ~~$48~~ $39.95

Yes, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $39.95* per year - a savings of $8.00 off the basic subscription price. Plus, I'll also receive the new '94-'95 COMPUTERWORLD Salary Survey FREE just for trying COMPUTERWORLD.

P/Code 98

First Name ________ MI ________ Last Name ________

Title ________ Company ________

Address ________ City ________ State ________ Zip ________

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew

Basic Rate: $48 per year

* U.S. Only. Canada $95, Mexico, Central/South America $150, Europe $295, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medical/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 65. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Dist./ Retailer
   - 95. Other________________ (Please Specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr.: Network Sys., Data/Tele. Comm., LAN Mgr. /PC Mgr., Tech Planning, Admin Svs.
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Programming Management, Software Developers
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 60. Sys. Integrators/VARs/Consulting Mgt.

   CORPORATE MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   - 51. Sales & Mktg. Management
   - 70. Medical, Legal, Accounting Mgt.

   OTHER PROFESSIONAL MANAGEMENT
   - 80. Information Centers/Libraries, Educators, Journalists, Students
   - 90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)

   Operating Systems
   - (a) Solaris
   - (b) Netware
   - (c) OS/2
   - (d) Unix
   - (e) Mac OS
   - (f) Windows NT
   - (g) Windows
   - (h) NeXTstep

   App. Development Products ☐ Yes ☐ No

   Networking Products ☐ Yes ☐ No

COMPUTERWORLD

Recycled Paper

E2505-7

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

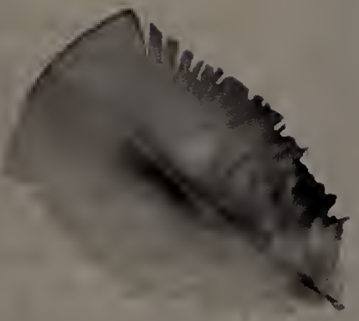
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-2144

Free Video: Avalon At IBM®

Manufacturing Distribution & Financials



Just nine minutes with our free video — *Avalon and IBM: Reengineering With Client/Server Technology* — and you'll see why Avalon's time-based solutions are helping so many ordinary manufacturing teams become extraordinarily successful. Not only did IBM's RISC System/6000®-based Austin systems keep the sub-second response time of their old mainframe-based MRP system, but with no additional floor space their three-week manufacturing cycle shrunk to two days.

Become a nine-minute genius. Call today.

800-AVALON1 (800-282-5661)
From Outside the United States Call 602-512-2000
FAX 602-512-2001

AVALON
SOFTWARE
Have Time Machine. Will Travel.

©1995 by Avalon Software. RISC System/6000 and IBM are registered trademarks of International Business Machines Corp. TRBA

SGI unwraps Internet authoring system

By Jean S. Bozman

MOUNTAIN VIEW, CALIF.

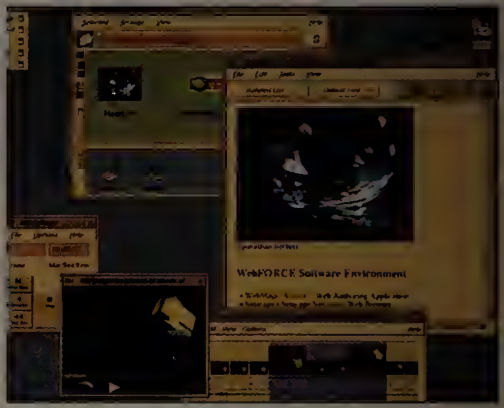
Silicon Graphics, Inc. (SGI) made its bid to deliver one-stop shopping for Internet document authoring last week. The vendor unveiled an $11,000 packaged Unix system that includes hardware, icon-based multimedia software and World-Wide Web communications links to create Internet home pages for business.

Analysts say they expect other workstation vendors to follow suit by packaging existing Unix workstations and servers with icon-based software. So far, there have been few icon-based authoring packages to speed Internet home page development, they said.

Home pages are created with HyperText Markup Language (HTML), which lets users jump between Web documents by selecting highlighted words.

Other companies have already created software to mask the complexities of writing in HTML. Interleaf, Inc. announced its Cyberleaf icon-based authoring software last fall, and Microsoft Corp. is promising Internet Assistant, an add-on to Microsoft Word that can generate HTML documents for Internet use.

Last week, SGI announced its WebMagic Author icon-based software and packaged its Indy and Indigo2 workstations as Internet development systems. Netscape Communications Corp.'s $39 Netscape Navigator client software and $1,495 Netsite Communications server software will be bundled with SGI's Unix machines, which range from $11,000 to $45,000. Marc Andreessen, co-founder of Netscape, said Netscape 1.1 will support the transmission of three-dimensional graphics this spring. Last week, SGI demonstrated one such 3-D animation written with its Open Inventor software.



SGI's Internet authoring package *is expected to expedite home page development*

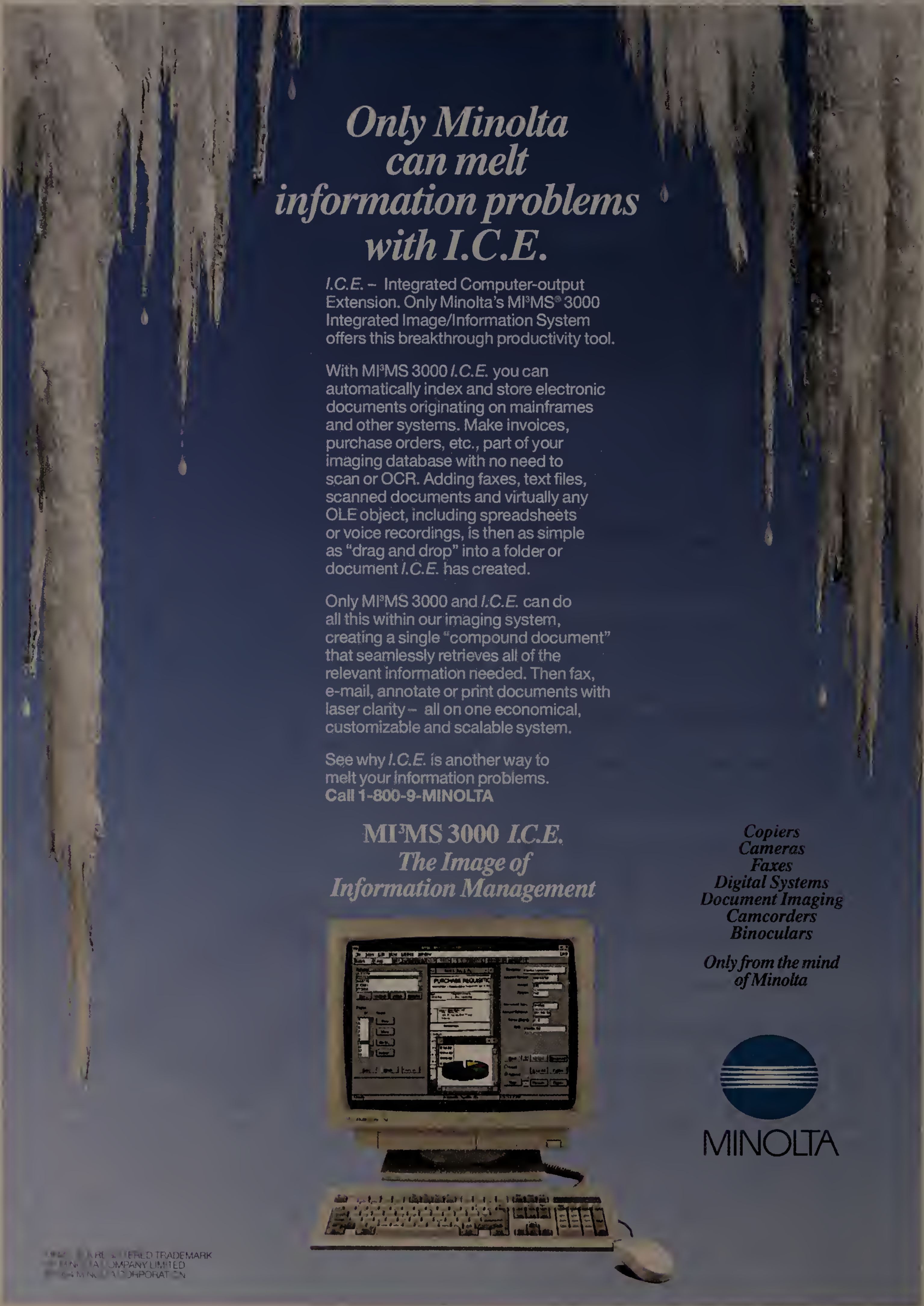
Patience is key ingredient

Creating an Internet home page requires patience as well as expertise. Greg McArthur, a software engineer who designs home pages for the National Center for Atmospheric Research in Boulder, Colo., edits HTML documents using the Unix-standard vi text editor on an Indy workstation and loads them onto a server to see the final result. "This moves us forward, leapfrog-fashion," McArthur said. "This software will make it faster for me and for a lot of people."

But using a word processor to create HTML text is not as hard as ensuring that the document can be easily understood — even if read on character-based screens, said Doug Johnson, a senior staff scientist at AER, Inc. in Cambridge, Mass. "You want to tailor your serving capability so that it looks good and works well for a variety of users," Johnson said.

Web nodes double every few months, but many businesses have yet to launch home pages, said Frank Gilbane, a director at CAP, Inc., a Marshfield, Mass., research firm. "Corporate people are holding back not only because of security [concerns], but there are some that need the full SGML [Standard Generalized Markup Language] features to fully describe documents," he said. SGML supports more formatting and tables.

Unix servers dominate the worldwide Internet server market. Sun Microsystems, Inc. sells the Netra packaged Internet server, which includes security firewalls. Sun also has a partnership with Interleaf but has not bundled the Cyberleaf authoring product with Sun systems. "Our business model is to work with key" independent software vendors, Sun's Chief Technology Officer Eric Schmidt said last week.



Only Minolta can melt information problems with I.C.E.

I.C.E. – Integrated Computer-output Extension. Only Minolta's MI^{3}MS® 3000 Integrated Image/Information System offers this breakthrough productivity tool.

With MI^{3}MS 3000 *I.C.E.* you can automatically index and store electronic documents originating on mainframes and other systems. Make invoices, purchase orders, etc., part of your imaging database with no need to scan or OCR. Adding faxes, text files, scanned documents and virtually any OLE object, including spreadsheets or voice recordings, is then as simple as "drag and drop" into a folder or document *I.C.E.* has created.

Only MI^{3}MS 3000 and *I.C.E.* can do all this within our imaging system, creating a single "compound document" that seamlessly retrieves all of the relevant information needed. Then fax, e-mail, annotate or print documents with laser clarity – all on one economical, customizable and scalable system.

See why *I.C.E.* is another way to melt your information problems.
Call 1-800-9-MINOLTA

MI^{3}MS 3000 *I.C.E.*
The Image of Information Management

Copiers
Cameras
Faxes
Digital Systems
Document Imaging
Camcorders
Binoculars

Only from the mind of Minolta

MINOLTA

[illegible] REGISTERED TRADEMARK
[illegible] COMPANY LIMITED
[illegible] CORPORATION

Micro Focus Revolve®

What would you do if you could make real-time changes and watch their effects at the same time?

Significantly reduce system maintenance and enhancement costs with Revolve's ability to perform system-wide impact analysis and documentation. Micro Focus Revolve is a powerful development and analysis tool that allows you to graphically view any application and the impact of any changes to it.

Unlike less scaleable products, Revolve quickly and clearly documents the relationships between source code, data, screens, JCL and other aspects of very large systems to help you accurately estimate the cost and timing of projects. The impact analysis tool then identifies all of the locations and effects of proposed changes, such as updating the date calculation to go beyond the year 1999.

Revolve seamlessly integrates with Micro Focus COBOL or can be used as a stand alone development, testing and analysis environment. In either case it lets you manage your system and see exactly how far your changes will reach.

See for yourself. Contact Micro Focus at 800 MF COBOL Ext. 1203 and ask for your copy of the Micro Focus CD. On it, you'll find descriptions and interactive demonstrations of Micro Focus Development Tools.

"A better way of programming."™ MICRO FOCUS®

Micro Focus and COBOL Workbench are registered trademarks of Micro Focus Ltd A better way of programming is a trademark of Micro Focus Ltd Revolve is a registered trademark of Burl Software

Hackers try new tacks

Agency sounds warning on 'significant new threat to Internet'

By Gary H. Anthes

An increasingly sophisticated cadre of computer hackers can be met at every turn by equally determined defensive measures. But unfortunately, too few users are employing the defenses.

Last week, hackers used two well-known, but apparently heretofore unused, methods to gain illegal access to computers at Stanford University and the University of California at San Diego.

The two techniques are known as "Internet Protocol spoofing," which enables an intruder to gain access to a system, and "hijacked session attacks," in which an intruder gains control of other sessions active on the system.

Although only two intrusions were reported publicly last week, "there are certainly others going on, and I suspect there are a lot we haven't found yet," said William J. Orvis, a team member at the U.S. Department of Energy's Computer Incident Advisory Capability (CIAC) at Lawrence Livermore National Laboratory in Livermore, Calif.

The attacks triggered alerts over the Internet from the CIAC and the Computer Emergency Response Team at Carnegie Mellon University in Pittsburgh. The alerts described straightforward and reliable preventive measures users can take to thwart the attacks.

However, the CIAC warned, "These attacks represent a significant new threat to Internet systems. Without proactive measures in place, these attacks are very difficult to detect or defend against. [The] CIAC strongly recommends sites implement the solutions described below as soon as possible."

Tactical maneuvers

EXPERTS SUGGEST THESE COUNTERMEASURES TO INFILTRATION

Vulnerability: *IP spoofing*

This allows an intruder to essentially impersonate a local system's IP address. Other local systems can be tricked into believing incoming connections from the intruder actually originate from a local "trusted host" and will not require a password.

Defense

Filter packets as they enter your router from the Internet, blocking any packet that claims to have originated inside your local domain.

Vulnerability: *Session hijacking*

Once the intruders have root access on a system, they can use a hacker program to dynamically modify the Unix kernel, allowing them to hijack, or take over, an existing terminal and log-in connections from any user on the system.

Defense

Prevent root compromise through careful system management, installation of security patches and network controls such as firewalls. Sites not requiring SunOS loadable modules should disable this feature.

Source: Computer Incident Advisory Capability, Lawrence Livermore National Laboratory, Livermore, Calif.

Detection rate: 5%

Using the Internet, the Pentagon's Center for Information Systems Security (CISS) tries to penetrate Defense Department systems worldwide. The hackers are able to gain unauthorized access to systems 95% of the time. Only 5% of the break-ins are detected, and of those, less than 5% are reported up the chain of command.

SOURCE: U.S. ARMY COL. JOHN J. SHELDON, COMMANDER OF THE CISS, DEFENSE INFORMATION SYSTEMS AGENCY

Automated woe

Clifford Neuman, a computer scientist at the Information Sciences Institute at the University of Southern California at Marina Del Rey, said the methods used in the attacks had not been used sooner because they are difficult to execute. But now, he said, someone has written a program that automates the process.

"It is likely that this program is going to be widely available among the community of hackers," Neuman warned.

While computer security experts praised the alerts as offering sound advice, many said they did not go far enough. "We all understand the limitations of using IP addresses for authentication," said Stephen T. Kent, chief scientist for security technology at Bolt Beranek and Newman, Inc. in Cambridge, Mass. "But we haven't yet made the jump to cryptographically-based continuous authentication, which is what the military does and what we should do."

"Similar incidents will continue to occur," said Jim O'Neil, information security manager at Pacific Bell in San Francisco. "This will remain a hot issue until administrators take appropriate action. As [they do], interest in perpetrating this type of attack will wane."

"I don't think hackers are getting the upper hand," said Daniel Geer, vice president for security consulting at OpenVision Technologies, Inc. in Pleasanton, Calif. "But the number of naive networks in the world is going up very fast. This is an area where a little bit of preparation is worth a lot of cure."

Third try could be charm for Newton

By Mark Halper

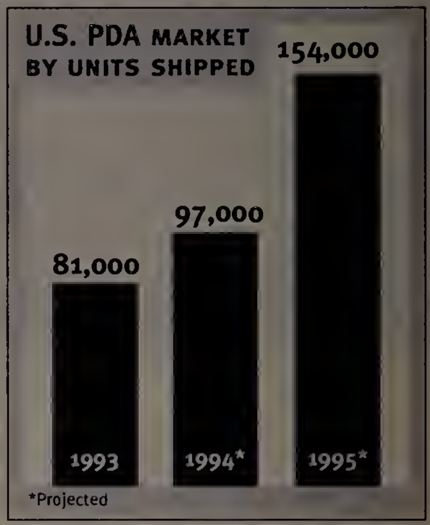
CUPERTINO, CALIF.

Sobered by a market that did not share the vendor's early euphoria for personal digital assistants (PDA), Apple Computer, Inc. today will introduce the third iteration of its Newton MessagePad.

The Newton MessagePad 120 provides users with twice as much memory as predecessor MessagePad 110 — 2M bytes vs. 1M byte. But the 2M-byte version will be priced at $699, while the 1M-byte MessagePad 110 costs $599.

The MessagePad 120 has improved screen resolution and enhanced wireless communications capabilities. It also allows for easier swapping of software with desktop computers.

Whereas Apple once ballyhooed the Newton as a near-revolutionary product, 18 months of soft sales has given the company a more pragmatic marketing face. According to BIS Strategic Decisions, a market research firm in Norwell, Mass., 97,000 PDAs were sold last year, up from 81,000 in 1993.



Source: BIS Strategic Decisions, Norwell, Mass.

The new Newton represents an "an evolutionary, not revolutionary" iteration of the product, said Susan Schuman, communications solutions manager at Apple's Personal Interactive Electronics Division.

While Apple has landed a few large corporate sites such as Monsanto Co. in St. Louis, many information systems directors say they have yet to see enough potential usefulness to merit purchasing Newtons or other PDAs in large volume.

Bob Anderson, a senior analyst at A. O. Smith Automotive Products, Inc. in Milwaukee, noted that PDAs serve well when a user has repetitive tasks, such as entering data into forms at supermarkets.

But many salespeople — who are a significant target PDA market — "prefer to go back to their desktop and whip things up in a nice format on a spreadsheet," Anderson said.

The 2M-byte MessagePad 120 should help Apple sell to the corporate market because it will help support large customized software, said Tim Bajarin, an analyst at Creative Strategies International, Inc. in San Jose, Calif. "The No. 1 thing the Newton people were screaming for was enhanced memory. You really need it in the vertical markets."

Platform vendors exit network consortium

By Steve Moore

Hopes that application and platform vendors would cooperate to provide users with sorely needed network management standards dimmed last week as the four platform vendors pulled out of the Management Integration Consortium (MIC).

But despite the departure of Hewlett-Packard Co., IBM, Digital Equipment Corp. and SunSoft, Inc. from the group, the remaining members — more than 150 applications vendors — plan to continue their campaign for user support of MIC standards. That will begin with a common data repository and a common data access application programming interface.

The platform vendors said such standards should be pursued through established standards groups such as X/Open Co., the Network Management Forum (NMF) and the Internet Engineering Task Force.

MIC Chairman Jim Corrigan, who is also president of Ki Networks, Inc. in Columbia, Md., stressed that the MIC's goal is to accelerate standards development in cooperation with other such groups. He noted that the MIC has submitted its repository proposal to X/Open and has adopted the NMF's Open Management Edge specification for application integration.

Users applauded the MIC's goals but remained skeptical about the consortium's effectiveness without the support of the leading platform vendors.

"A standard way for management tools to exchange information would make a management operations center a heck of a lot easier to implement," said Mike Prince, MIS director at Burlington Coat Factory Warehouse Corp. in Lebanon, N.H. However, he added, the consortium will have trouble without HP and Sun in particular because users of OpenView and SunNet Manager constitute "an overwhelming preponderance of people using network managers."

"We've all been jaded because we read in the press about these consortiums starting up, and that's the last time we ever hear about them," said Paul Jones, general manager of information services at Unocal Corp. in Anaheim, Calif. Another problem, he said, is that proposed standards too often "take so long to go through committee that by the time they come out, technology has gone past them."

Corrigan said products implementing MIC standards will ship by year's end.

Who says AT&T's data communications services are the best?

Best Digital Private Line Service
Best Frame Relay Services
Best Switched Digital Services
Best Value-Added Network Services
Best Virtual Network Services
Best 800 Services

Best Dedicated Services
Best Switched Digital Services
Best Overall

Best Technology
Best Price/Performance
Best Service/Support
Best Documentation
Prefer to Do Business With

The experts.

In the last year, the data network customers who read *Data Communications, Network World* and *Computerworld* gave AT&T data communications services every award possible in data network categories.

Why was it such a clean and decisive sweep? Because AT&T gives you the technical expertise, servicing support and reliable performance you need. Delivered by advanced systems like FASTAR,® which immediately identifies cable cuts and automatically begins rerouting data. All within seconds.

To speak to a knowledgeable representative or receive faxed information on the data transport technology that's right
for the life of your business,
call **1 800 332-7FAX, Ext. 400.**
And add to your expertise.

© 1994 AT&T

AT&T. For the life of your business.℠

AT&T

Lotus hears call of CC:Mail users

By Suruchi Mohan
ORLANDO, FLA.

Making CC:Mail administrators' lives a little easier was the goal of several products announced at Lotus Development Corp.'s Lotusphere developers conference here last week.

Chief among them was the DB8 post office, which is expected to ship in mid-1995. DB8 has a file-sharing architecture that will support the shipping version, or Version 2.1, and the yet-to-be-released Version 2.5 on the client. But for users, the biggest advantage of DB8 is its 24-hour, 7-day operation.

This continuous uptime means users can be on-line while administrators tinker with backups and reclaims, explained Vince Shilling, a CC:Mail administrator at Pepsico Foods International in Plano, Texas. And that removes a major hurdle from the task of administering a post office, especially in environments that support many mobile users and span several time zones, he added.

"The only reason to upgrade to DB8 right now is the 24-by-7 operation," said Kevin Amos, a support analyst at Placer Dome Canada Ltd. in Vancouver, British Columbia. Otherwise, "who cares about the database these days as long as you get your mail?"

Full of features

Users also applauded the following DB8 features:

- Allows Messaging Application Programming Interface clients to be used with the post office, which means administrators do not have to mandate which mail package end users should use.
- Lets users move a file from the server to a laptop without using the export/import utility.
- Allows administrators to add fields to the database.

Additionally, Lotus officials talked about building a client that would work on the DB8 post office and with Notes. But "they've never shown that," said Cliff Conneighton, president of The Conneighton Group, Inc. in Hollis, N.H. "All they showed was Notes. I don't think we'll see that product in 1995."

Lotus also announced a slew of other products and business partnerships. Products include the Lotus Fax Server, which will replace CC:Fax, and Lotus Video for Notes Release 1.

The vendor also signed an agreement with AT&T Corp. whereby the two companies will integrate their voice mail and electronic-mail systems. It also sealed a deal with Motorola, Inc. to develop and market the AirMobile wireless technology as an add-on to CC:Mail and Notes.

But user reaction to these announcements seemed lukewarm at best.

"Lotus video and fax are sizzly sorts of things," said Steve Aho, vice president of professional services at MicroAge Computer Centers, a reseller in Kitchener, Canada. "From strictly the bandwidth point of view, people will have trouble in implementation. Video, audio and fax files are huge and chew up a lot of disk space; [they] require a lot of hardware resources."

Amos said that even though his company does not employ a fax server, if he were to consider one, he would go with Lotus and hope for clean connections with other Lotus products. "On the other hand, I would be leery because CC:Fax was a poor product," he added.

Users were confused, too, about whether they should choose Lotus' fax server product, which will not ship until mid-April, or one already on the market. "What do they offer that's new?" asked a user at an electrical appliance company.

Lotus drops

CONTINUED FROM PAGE 1

forms on which they can run the groupware product.

"By offering the runtime [client], it removes a big obstacle to us putting everyone at our site up on Notes," said Mark Bowden, a senior information systems analyst at First Mississippi Corp. in Jackson, Miss.

So far, First Mississippi has run Notes mostly in isolated pockets of its financial departments. Bowden said the high client prices under the past pricing structure prevented his firm from rapidly deploying more Notes clients.

"They should have done this before," echoed Peter Nordman, a data communications specialist at Valmet's Procons Data Corp. in Jyvaskyla, Finland.

The welcome reception for the sought-after runtime client was a far cry from the thumbs-down reaction users gave the Notes Express launch last September. Software developers decried the $99 bundle, and users expressed dismay because the low-end product limited the applications they could run on it.

The runtime price-cutting move was one that Lotus had been extremely reluctant to make. As recently as three weeks ago, Jeff Papows, vice president of Lotus' communications group, said the vendor was just beginning to get the message that users wanted a runtime version of Notes. But another Lotus executive said the company began considering the change "the day after the Notes Express announcement."

Lotus is gambling that by cutting prices and forgoing short-term profits, it can proliferate its product well beyond the 1.3 million seats on the market today.

A company first

In its fourth quarter of 1994, Lotus' communications products pulled in $134 million in revenue compared with $130 million in revenue from desktop applications. That was a first for the company. By comparison, Lotus pulled in $211 million in desktop sales and $68 million in communications products for the same quarter in 1993.

While the lower prices may dampen short-term revenue, Wall Street analysts were buoyed by the move. They noted that selling more clients at a lower price could sell more servers and services, thus broadening Notes' installed base.

"By the time Microsoft ships [Exchange Server], Lotus could have gained the critical mass and so much momentum that Exchange will not be a threat," said Paul Johnson, an analyst at Robertson, Stephens, an investment bank in New York.

Lotus also announced a new client bundling arrangement for Notes Express. Apple Computer, Inc. will bundle it with certain Power Macintoshes and PowerBooks. IBM said it will bundle it with OS/2 Warp.

Analysts said that with Notes' current momentum, augmented by the pricing and bundling arrangements, Lotus Chairman Jim Manzi's estimate of 2.9 million seats by the end of the year may prove conservative.

"They'll probably get another million seats from the Macintosh deal alone," said Matthew Cain, an analyst at Meta Group, Inc., a consulting firm in Stamford, Conn. The Macintosh bundles are expected to ship by the end of the second quarter.

How long Lotus will keep its prices down is anyone's guess. When asked if Lotus would consider raising server prices to compensate for client revenue, Papows would only say that the company is not considering raising server prices now.

"I hope they don't," Bowden said. "But it wouldn't surprise me."

Sphere gazing

Other major product announcements from Lotus last week include the following:

- **NotesView:** A graphical management tool that enables a network administrator to manage up to 150 Notes servers across the enterprise. NotesView for the Enterprise costs $6,000 and requires Hewlett-Packard Co.'s OpenView to operate. A version based on HP/UX will be available by midyear. Lotus sources said versions of NotesView based on IBM's NetView and Sun Microsystems, Inc.'s SunNet Manager will be available by summer.
- **InterNotes:** A new product line aimed at providing Notes sites with access and publishing capabilities for the Internet and the World-Wide Web. In addition to allowing users to publish HyperText Markup Language documents to the Web, it enables them to use controls and administrative tools in Notes to manage end-user access and security. The product costs $7,500 and is expected to ship in the first quarter.
- **Notes HiTest Tools for Visual Basic:** A collection of 12 Windows development tools for the Notes environment. These were designed to give Notes and Visual Basic users the ability to leverage the object store and groupware services in Notes. The tools include custom controls that graphically link objects in an application. The tools also allow Visual Basic-enabled applications such as Microsoft's Excel or Word to access the Notes object store. Available in the first quarter, the tools are priced at $610.
- **Lotus Video for Notes:** A product that lets users capture, record, edit and distribute digital video to and from Notes documents. The product comes with administrative tools to manage bandwidth usage over wide-area networks and determine when to perform replication across the WAN. Lotus recommends users run the client software on 33-MHz Intel Corp. I486 processors.

—William Brandel

Reporter's Notebook

Enthusiasm among **Lotusphere** attendees ran high. The 6,500 attendees at the Notes 4.0 demonstration gave a standing ovation and yelled they would stay longer for more. One user was overheard saying, "It blew the socks right off my feet."

Lotus execs would not entertain questions about the perennial rumors about Lotus' chance of acquisition. Chairman Jim Manzi did say he would not want people to read into any upcoming lunch dates he might share with Madonna or Michael Jackson.

Lotus broke industry protocol by not leaking the news of its runtime client. As a result, not all users were pleased with the offering, a Lotus exec said. Some customers who recently bought into volume Notes licensing agreements were unhappy to find they could have waited a week and saved tens of thousands of dollars. The executive said Lotus would give unit purchase credits to some of these customers.

In a keynote, one pundit asked the audience to think of its competition five years ago and five years hence. Manzi later said, "Gee, things must be pretty stale at Lotus."

Digital enters remote market with NetRider

By Neal Weinberg

Digital Equipment Corp. will jump into the remote access market next week with a software package designed to help information systems managers tame the menagerie of laptops, PCs and client software being used by telecommuters.

The Digital NetRider 90 and NetRider 900 systems, slated to be unveiled Feb. 6, are aimed at companies with remote offices, mobile sales forces and telecommuters. "This is an important market," said Kimball Brown, an analyst at Dataquest, Inc. in San Jose, Calif.

Brown said there are plenty of niche players on the scene already, but there is an opportunity for Digital if its product stands out and the company leverages its sales force.

The NetRider software was designed to link different types of laptops and PCs, including Apple Computer, Inc.'s Macintosh, into the network through TCP/IP, IPX or AppleTalk. The system is backed by an 8-port or 32-port access server. It includes Internet browser software and unlimited licensing for remote nodes.

Children's Hospital in Boston plans to improve its remote access to an ever-increasing number of clinics and doctors' offices, said Dave Power, a network analyst at Children's. When it does, "doctors will be looking to us for a complete solution," he noted.

The University of New Orleans is grappling with increased demand for remote access from students and faculty, said Daniel Smith, a senior network analyst there. Currently, the school has "taken the chicken way out," he said, by providing support only to DOS/Windows products because that is the largest installed base.

Smith said that eventually the campus will buy a package that addresses both compatibility and Internet access. But he said he has questions in areas such as security, hardware needs, licensing costs and staffing requirements.

Stampede Technologies, Inc. in Dayton, Ohio, provided software for NetRider that lets people in the field gain remote access to their office computers. The NetRider 90, priced at $3,400, will be available next week; the 900 model will be available in March for $9,345.

Senior editor Laura DiDio contributed to this story.

Users shape new CDPD specification

By Michael Fitzgerald

Users should now find the Cellular Digital Packet Data (CDPD) protocol more to their liking thanks to an update to the specification announced last week.

"[This] is the spec we feel we can hang our hats on for years to come," said Chuck Berman, director of market development at McCaw Cellular Communications, Inc.

CDPD, a digital overlay to the analog cellular voice network, lets users send short packets of information without being connected to a phone line. The new CDPD specification will improve interconnections between the various vendors that run the networks, which will lower costs, boost performance and expand functionality.

Users contributed heavily to CDPD System Specification 1.1, Berman added. It will be rolled out in mid- to late 1995.

McCaw is a member of the CDPD Forum, Inc., an industry umbrella group that sets the CDPD specification. Requests from potential large users were given heavy weight, Berman said.

The new protocol was also shaped by the humbling experience of the current specification's slow rollout.

"Costs need to come down before users will embrace this network," said Gib Hoxie, executive vice president of The Pacific Group, a Santa Clara, Calif., consultancy.

STABILITY

IF YOUR TECHNOLOGY SUPPLIER GOES AWAY, YOUR INVESTMENT COULD, TOO.

In an industry dominated by change, there's one constant. MicroAge.

Since 1976, we've been growing. Not through mergers or acquisitions, but by constantly strengthening the ways we serve our customers.

In fact, we created the MicroAge Infosystems Services Network expressly to meet the high-end needs of corporate America. Today, some of the world's largest companies depend on us to implement their critical IT projects.

Not just because we offer world-class distribution, integration, and ISO 9002-certified configuration services. But because we back it with the stability of the industry's longest record of profitable quarters and leadership that's been intact since the beginning.

No one else can say that.

What's more, a partnership with MicroAge Infosystems Services is a partnership with IBM.® Our IBM inventory, including IBM PC 300 and 700s, IBM 500 Servers and the popular IBM ThinkPads,® ensures the systems you need are ready when you are.

Better yet, our dedicated IBM National Account Managers will roll up their sleeves to help you put these systems to work across your entire enterprise.

COUNT ON IT.
COUNT ON US.
CALL (800) 440-8982, EXT. 3161

Helping you work faster, better, cheaper™

Infosystems Services

Alan P. Hald,
Vice Chairman and [illegible]
[illegible], Inc.

All trademarks and registered trademarks are properties of their respective companies.

Keeping pace with Computer Associates

Chairman and CEO Charles B. Wang sounds off on customer relations, ASK and Unicenter

Two weeks ago, Computer Associates International, Inc. did what it has done regularly for nearly 20 years — posted eye-popping quarterly financial results. Revenue for CA's third quarter, ended Dec. 31, rose 26% from the previous year. Profit grew 40%, to $174.2 million.

Computerworld *senior editor Thomas Hoffman caught up with Charles B. Wang, CA's chairman and chief executive officer, last week.*

CW: CA's numbers have been very strong for the past several quarters, yet many people in the industry continue to show amazement at CA's continued success. Why do you think that is?
Wang: Everybody's got these wonderful spreadsheet models — goddamn spreadsheets, I tell ya — and they [industry gurus] don't know how to look at a company that doesn't fit it. I look at software as software.

Charles Wang says *CA added more value to the products it acquired than the previous owners could have own their own*

CW: Until recently, there were analysts who still didn't know what CA's client/server strategy was.
Wang: It's certainly a reflection of our inability to get the right word out. [But] to do $300 million in [client/server] revenue in 12 months, I wish I had more products that weren't so clear to everybody.

CW: Let's talk about the ASK Group, Inc. acquisition. Some ASK users were skeptical of CA's intentions with the products, believing that CA might just plunder the products for their revenue.
Wang: I defy you to look at any of the products we acquired. If anything, we have added more value than any of those companies could have done on their own. Number two, don't forget that this was our first big Unix acquisition. We don't have a base there. Most of these [ASK users] don't know CA.

CW: Yet the retention rate of ASK customers has been high?
Wang: I don't think we've lost any. There was one, the Royal Air Force. They did a letter of intent with ASK and, yes, Informix got that because there was a huge fight internally. I'm not going to get into that.

CW: How would you characterize the reaction to CA's flexible licensing options introduced in 1992?
Wang: We are signing the large [customers] and publicizing those. Maybe we've converted 25% of the base. All I ask [of customers] is a commitment longer term. I'm not asking [users] for more money.

CW: Well, in the three years since you laid the foundation for alternative licensing, has CA made any revisions to the way these licenses are constructed?
Wang: Constantly.

CW: Are they done on a customer-by-customer basis?
Wang: No. And that's why we publish it. We're just now in the process of introducing user-based pricing for our business applications [such as CA-Masterpiece/2000].

CW: Clearly there's been a dramatic shift in customer attitudes toward CA's support, service and pricing in the past few years. Was there a conscious decision about three years ago to start treating your customers differently?
Wang: Absolutely. We didn't have relationships with customers. We sold them products. So we took our sales force, basically cut it in half [and installed] service reps who do nothing more than build relationships. That's probably one of the biggest gambles I've taken at CA.

CW: Many customers felt alienated during CA's legal battles with EDS.
Wang: When we got together with [EDS'] Les Alberthal and Gary Fernandes, it was scary in the sense that we had been so stupid to let lawyers run the show. We became prisoners of bullshit. And we both should have known better because [lawyers] bill by the hour.

CW: Despite the financial success of CA-Unicenter, there have been dramatic changes to the product line in the past year, such as price slashing and the Simple Network Management Protocol support that's been added. Were these changes based on customer feedback?
Wang: Customers did say that they wanted the [Unicenter] prices cheaper, so yes, that was a recognition. And there's so much more to come.

CW: Such as?
Wang: Exciting stuff. We're working very closely with the network management providers, particularly the two major ones, [Hewlett-Packard's] OpenView and [IBM's] NetView. We're also putting Unicenter on top of Ingres.

See Inside Lines, page 114.

Harsh words

CA's Charles Wang offered his comments on whether a lawsuit filed by tiny Vermont software developer Reliability Research, Inc. — which CA won two days later — had a leg to stand on. "It's the biggest crock of . . . in the world," he said. "A bunch of sleazebag lawyers, who have no idea what CA was, take one word out of a contract."

Let's make a deal

CONTINUED FROM PAGE 1

major project before he left his post as chief information officer at American Cyanamid Co. last June, he said.

By consolidating maintenance and support of 10 Oracle databases running on various machines down to three primary site licenses, American Cyanamid in Wayne, N.J., expects to save $500,000 in the next three years, Zeitz said.

Out with the old

In general, users should try to shake vendors out of old thinking. The historic model of 15% to 25% of software license fees for maintenance "is really just an arbitrary, black art kind of arrangement," said Arthur Fakes, an attorney in Lombard, Ill., who specializes in negotiating software contracts.

Percentage-based maintenance often "becomes a revenue-generating mechanism for vendors that does not always correlate to the value received by the customer," according to the Society for Information Management, which recently published a white paper on software licensing.

Indeed, some users are beginning to channel frustration borne of high price tags into negotiating leverage, said Mike Fisher, database manager at Medical Inter-Insurance Exchange. The malpractice insurance firm in Lawrenceville, N.J., was recently able to talk Oracle into a deal to hold maintenance costs steady, even though the exchange added new products to its shop, Fisher said.

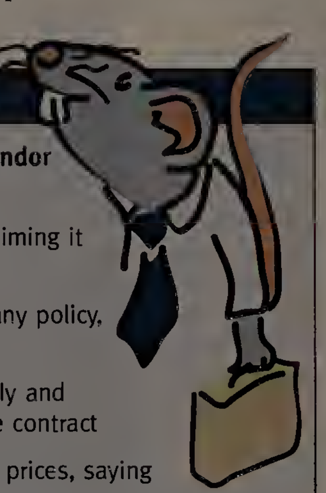
One method to save on support that has gained ground in the past 10 to 12 months is the per-call approach, according to Fakes. Instead of shelling out dollars based on a straight percentage of license, users pay a set amount of money each time they call a vendor for support. Often, a monetary ceiling as well as a floor are attached to the agreement.

"I've seen it used with success at some very large U.S. companies, mainly in the Fortune 200," he said.

Smelling a rat

Watch for and counterpunch these common vendor negotiating ploys:

- Presenting a standard contract early on and claiming it won't deviate from it
- Claiming a user demand is flatly against company policy, though this is not a ruse every time
- Assuring a user that his specific worry is unlikely and therefore does not need to be addressed in the contract
- Pressuring for a quick deal to lock into today's prices, saying fees are about to go up



Source: Data Tech Institute, Clifton, N.J.

American Express Co.'s IS group in Phoenix typically demands, and gets, options that other user firms do not, Fakes noted. American Express officials declined to comment on negotiation tactics. Other notoriously tough user firms include Citibank NA and Texas Instruments, Inc., he said.

The per-call technique is also gaining steam as an option fastened to traditional percentage-based deals. The reasoning? New software has a life span. So it may be OK to pay higher fees for maintenance when the software is new and relatively unstable in the first year or 18 months, for instance. But as bugs are worked out and expertise in caring for the software grows, continued high maintenance can be unfair.

"Think about the difference in service that 18% or 20% gets you in Year 1 vs. Year 4," said Howard Rubin, a consultant at CAP/Gemini America, Inc. in Poundridge, N.Y. "You probably don't want to continue paying that much if you're comfortable with the product."

Dangers exist, though. Per-call support can become expensive if users cannot reasonably predict how often they will need help, Rubin pointed out. He likened the situation to buying an extended warranty on a video camera. "You don't know if it's worth the $100 until you understand the typical frequency of repair in your camera's history," he said.

Playing the game

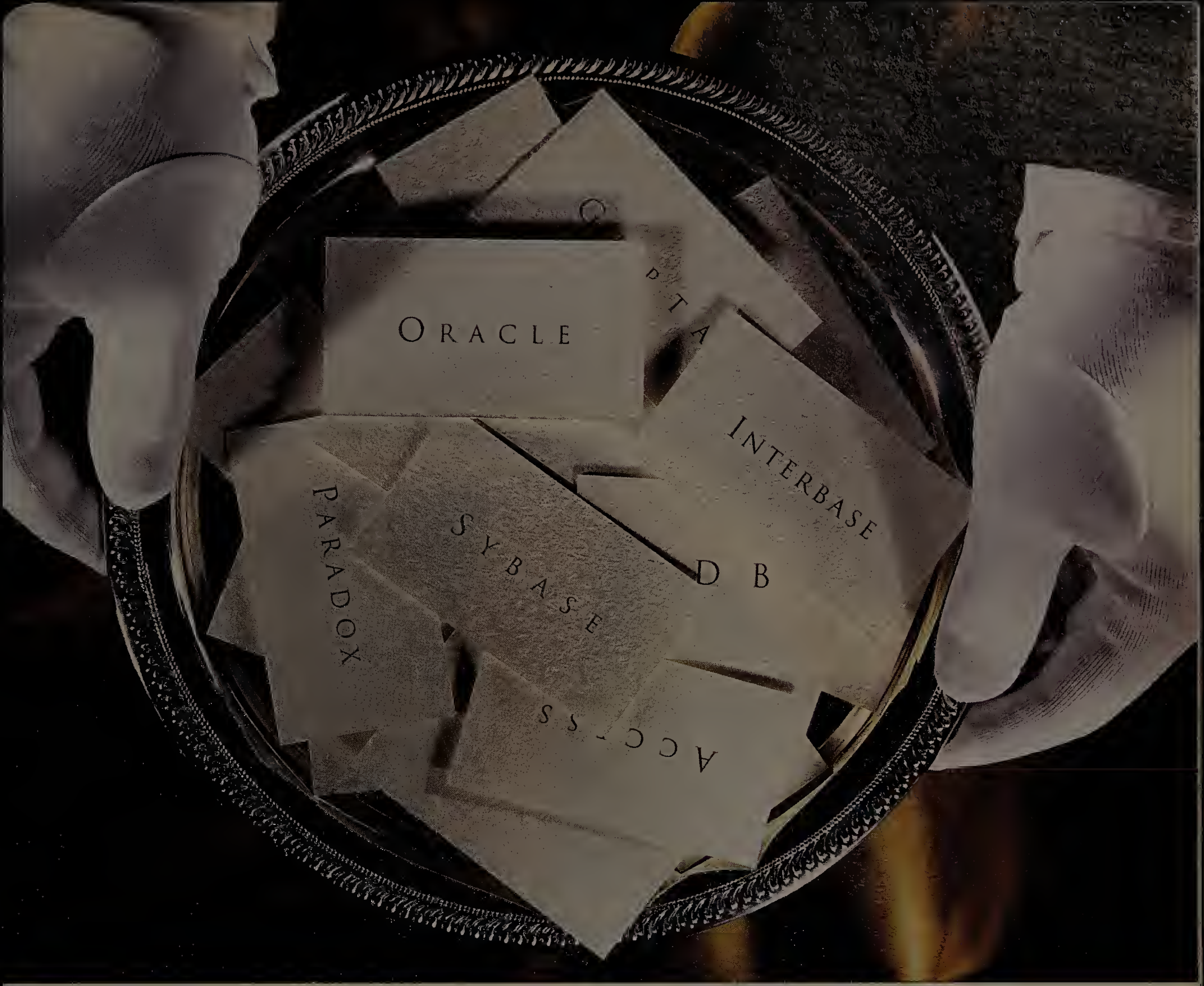
While the knees of industry leaders, such as Computer Associates International, Inc., IBM or Oracle, typically jerk when customers broach such new ideas, the younger, scrappier vendors are more willing to deal, users and consultants said.

Observers cautioned that the merit of — and savings from — these new deals differs case by case. Yet they agree that maintenance is ripe for rethinking.

As Frank Cooper, a consultant at International Computer Negotiations, Inc. in Winter Park, Fla., said, "It's one area where there is definitely fat in the price that can be negotiated out."

Only ReportSmith Gives You . . .

- WYSIWYG reports from "live" data
- Seamless database connectivity
- Reports from any size database
- Advanced crosstab analysis
- Free runtime for easy distribution

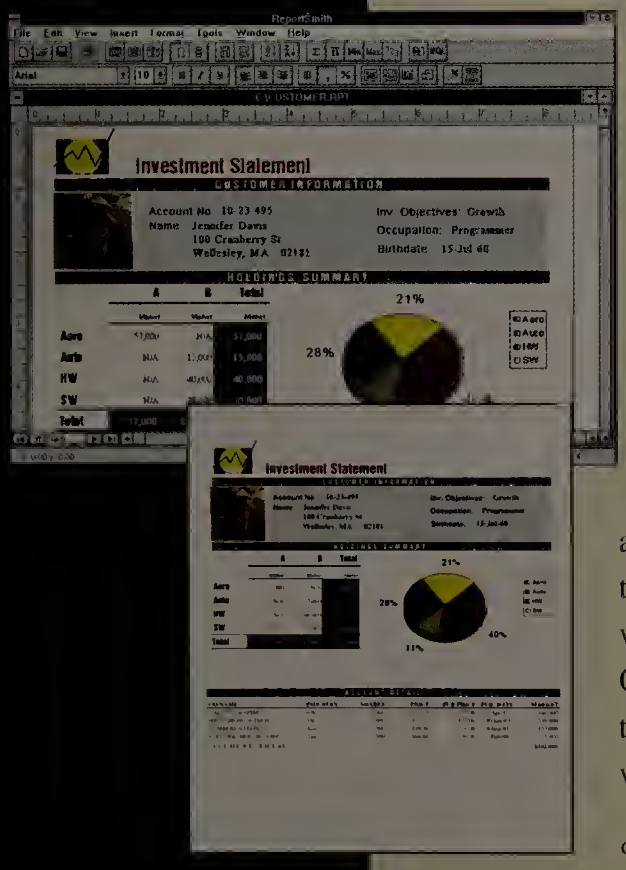


New ReportSmith 2.5
The well-connected SQL report writer.

The easiest way to meet your most demanding reporting requirements. Whether you're an occasional user, a power user or an applications developer, you'll quickly discover how fast and easy it is to create reports from your data with new ReportSmith® 2.5. Seamless connectivity to every major SQL and PC database lets you work directly and interactively with the "live" data. And since it's WYSIWYG, there are no more symbols or mock-ups to interpret.

Combine results from different databases in a single report. And that's just the beginning of ReportSmith's Client/Server power. With ReportSmith's memory management technology, you'll get your report finished fast no matter how large the data set. ReportSmith automatically manages memory to give you the best possible performance, and true Client/Server query processing options optimize report production.

For developers there's more . . . much more. A Data Dictionary allows you to display meaningful business-oriented names for views, tables, and fields, enabling your users to get the information they need with a minimum of fuss. A built-in macro language and full DDE and OLE 2.0 support help you integrate ReportSmith into other applications. Find out just how fast and easy it is to create spectacular reports with ReportSmith — the well-connected SQL report writer.



Investment Statement

CUSTOMER INFORMATION

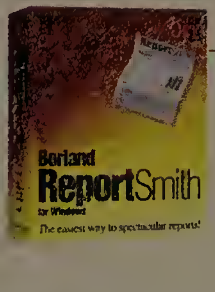
Account No 10-23 495
Name Jennifer Davis
100 Cranberry St
Wellesley, MA 02181

Inv Objectives: Growth
Occupation: Programmer
Birthdate 15-Jul 60

HOLDINGS SUMMARY

	A	B	Total
Aero	57,000	N/A	57,000
Auto	N/A	15,000	15,000
HW	N/A	40,000	40,000
SW	N/A	[illegible]	[illegible]
Total	57,000	[illegible]	[illegible]

Get Connected Now.
Call 1-800-336-6464, ext. 9723
In Canada, call 1-800-461-3327



Client/Server Solutions

- Reporting and Query Tools
- Application Development
- Decision Support
- SQL Databases

Borland
The Upsizing Company

Copyright © 1994 Borland International Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. BI 7739

LEGENT

The war is over. No more howitzer shells coming at client/server groups from the glass house. No more client/server people lobbing grenades at the MIS staff. Not that peace is always as peaceful as you'd like it to be. Networks going down, bottlenecks popping up, people screaming about applications they can't get to. And a nasty feeling that nobody is really doing anything to help you with any of it. When, in reality, all of us at Legent are doing quite a lot. We've put together the most extensive set of industrial-strength, distributed systems management tools available. We've also developed an open architecture called XPE™ that lets our software work together across almost anything you can wire together, regardless of function or platform, from mainframes to UNIX servers to PC LANs. Which means you can manage your systems from the platform of your choice, something our customers tell us they're happily doing right now. It's not a silver bullet, but it can definitely help you do your job better. Besides, it's peacetime. Who needs bullets?

Legent products and services help you manage practically every aspect of your systems, networks, databases and applications in a multi-platform environment. For a faxed capabilities overview call 1 800 676-5468 x2503

HP's OpenMail seeks identity

By Suruchi Mohan

Hewlett-Packard Co.'s OpenMail may be the best messaging system on the market, but it is sorely lacking in name recognition.

And some analysts said they suspect the Palo Alto, Calif., company's ineptitude in marketing OpenMail may have caused it to miss an important window of opportunity afforded by Microsoft Corp. and Lotus Development Corp., which are both late with their messaging products. Lotus has yet to move beyond the talking stage in delivering a stable client/ server messaging product.

"HP has a big market today for OpenMail as a server," said Tim Sloane, an analyst at Aberdeen Group in Boston. However, he noted that time is running out for HP as Microsoft's Exchange server and Lotus' client/server model of CC:Mail move closer to the finish line.

"OpenMail is HP's best-kept secret," said Bob Jull, president of LinkAge Office Information Solutions, Inc., a value-added reseller in Toronto. Although the product is based on excellent technology and customers are pleased with its capabilities, it has not met its sales potential, Jull said. Because the product is essentially a server, the sale is always a protracted affair because it is a system, not a product, he said. System sales are usually prolonged.

Mixed message

HP does not see itself as a server provider, however. It is positioning OpenMail as a messaging backbone that is capable of connecting several disparate systems, according to Raul Mujica, a product line manager at the company.

So while the OpenMail group within HP positions the product as a backbone, "the HP sales force is out selling it as a mail product," Sloane said.

"OpenMail is HP's best-kept secret."

—Bob Jull, LinkAge Office Information Solutions

Hence the confusion. The company has not been able to get a consistent message across in the marketplace.

OpenMail targets Fortune 500 companies that need to connect heterogeneous systems, Mujica said. But HP's servers connect well to form a backbone in a relatively homogeneous, not heterogeneous, environment, Jull said.

"Where there are 10 systems that want to connect, it's still SoftSwitch. Where it's just a couple of systems that need a strong server, that's where HP is," Jull added.

Under what terms?

When HP signed an agreement with Lotus in November 1994, it was not clear to users what role HP would play. The message from the two companies was muddled. In fact, for a while the industry widely speculated on the future of OpenMail and whether it was conceding the messaging market to Lotus.

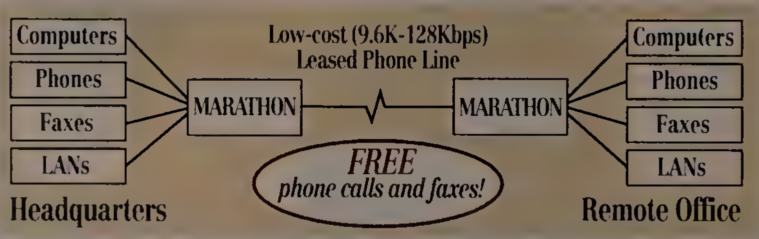
But what HP was conceding was only the groupware market. According to the agreement's terms, HP would sell Lotus' Notes on its 9000 Series 800 HP/UX platform. The two companies would still continue to develop their own messaging strategies.

For users employing OpenMail, HP's decision not to enter the workgroup computing waters raised some interoperability issues. Jack Powell, manager of networks and desktop support at Mobil Exploration and Producing Technology Center in Dallas, wants to use workgroup applications such as calendaring. He said he wonders whether HP's system is truly open.

Whatever happens to HP OpenMail as a client/server product — and not as a backbone — will depend largely on the success of Exchange and the Lotus product. "If Microsoft and Lotus are successful, HP will be limited to customers who want an integrator, not [a] vendor," predicted Dan Blum, principal at Rapport Communications in Silver Spring, Md.

"Marathon buys one of these every month"

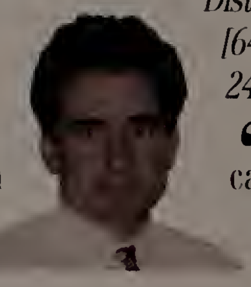
“We were skeptical about the savings. Even after we saw a live demonstration, we didn't think Marathon could save our classic Corvette dealership all that much money. But we figured we'd save at least enough to pay for the equipment and then keep some savings each month. So we installed a MICOM Marathon Data/ Voice Network Server in our Saugus Massachusetts showroom and another in our new Pompano Beach, Florida facility.



Marathon let us route incoming calls between our locations for free.

In just the first month, the savings paid for both Marathons. And every month since, Marathon has saved us the equivalent of a '58 Vette.

I'm Tony Visone of Visone Motors. I sell investments you can use and enjoy. And while a Marathon can't give you the same thrill as a vintage Corvette in your garage, it's an investment that can bring a smile to your face every month.”



Whether you have two or 250 locations, Marathon delivers all communications on one line. Ask for a free brochure today.

Call toll-free for the certified Marathon Distributor in your area (800) MICOM AD [642-6623] ext. 1034 or (805) 583-8600. 24-hour fax (805) 583-1997.

“The sooner you call, the sooner you can start investing in something you really want, instead of phone company toll charges.”

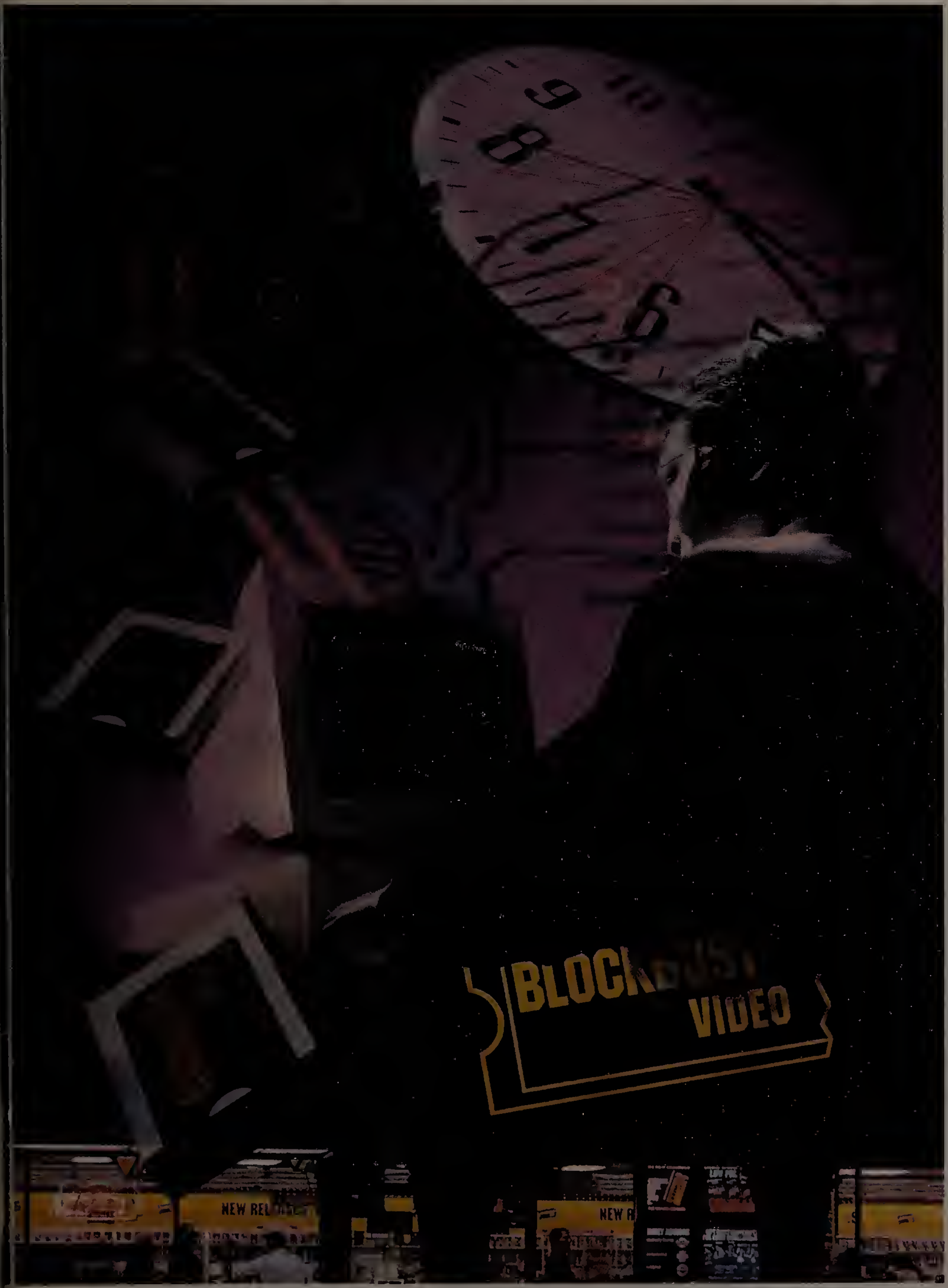
MICOM®

Products that pay for themselves.™

Trademarks are property of their respective owners

24 time zones.
4,300 stores.
55,000 employees.
50 million customers.

And one extraordinary company tracking it all.



Sprint Technology Helps Achieve Growth For BLOCKBUSTER.®

It takes a company with experience, vision and commitment to handle the network requirements of the world's largest video retailer.

That company is Sprint. With Sprint's Managed Network Service, Blockbuster Entertainment gets a revolutionary turn-key solution that combines everything from network design, software and hardware, to installation and 24-hour-a-day network monitoring. All working together using frame relay to link more than 40 LANs across the country into one. So when Blockbuster needs up-to-the-minute information on sales, distribution or payroll, the answer is ready and waiting.

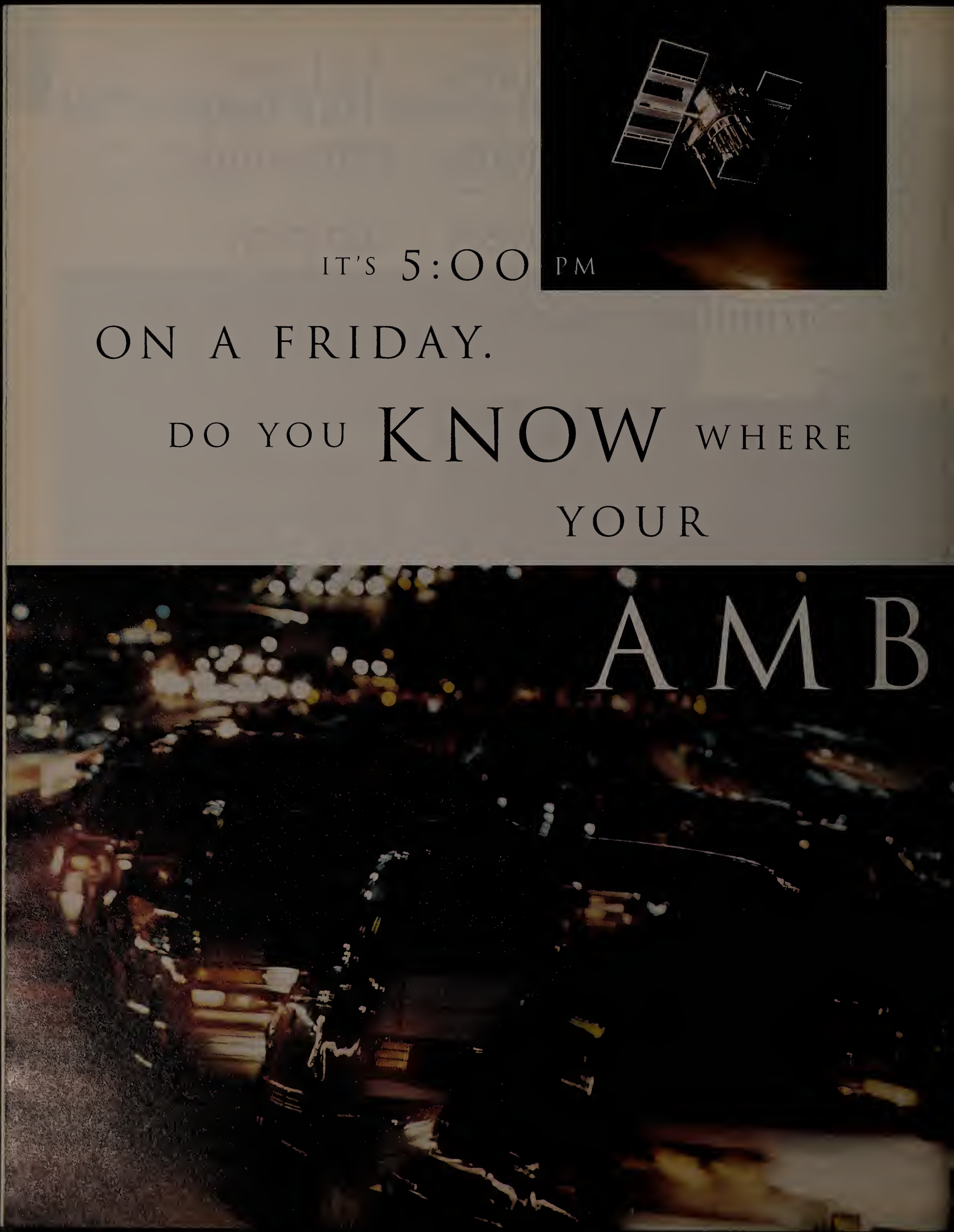
And, since it's all managed by Sprint, the network can expand with Blockbuster's business – without the need to retrain personnel or change systems.

Which leaves Blockbuster free to do what it does best: Keep the world entertained.

Now, if we can do this for Blockbuster, imagine what we can do for you. To find out more about Managed Network Service and how Sprint can help your business do more business, call us today at 1-800-669-4700.

Sprint.
Business

© 1994 Sprint Communications Company L.P.
BLOCKBUSTER, BLOCKBUSTER VIDEO name and design are registered trademarks of Viacom Inc., New York, NY 10036 © 1987, 1994.


IT'S 5:00 PM
ON A FRIDAY.
DO YOU KNOW WHERE
YOUR
AMB

⊕ Relax. If you're CareLine, Inc., you know where all your ambulances are. At every moment. Right down to the nearest intersection. Thanks to a revolutionary new tracking system. Made possible by a distributed computing solution using Microsoft® products. ⊕ CareLine is a top provider of emergency medical services in the U.S. They needed an efficient, cost-effective way to respond to a growing number of emergency calls. The solution? A computer-aided 911 dispatch system. Built on a foundation of Microsoft products, including Windows NT™ Server (part of the Microsoft BackOffice family). ⊕ The new system enables CareLine dispatchers to pinpoint ambulances by satellite. So the right vehicle goes to the right place in the shortest amount of time. Lives are saved. Along with money. ⊕ With the Windows NT-based system, CareLine dispatch centers can handle more calls with the same number of people. Distributed computing cuts downtime (and enhances productivity) by allowing workstations to stay up. Even when servers go down. ⊕ Powerful database and reporting features, using Microsoft Office and development tools, make problems easy to identify. And with standard PCs as clients, the system is highly scalable. ⊕ Walter Arndt is Senior V.P./C.I.O. at CareLine: "We've shortened response times while cutting costs, and our people are working more efficiently on a system that's incredibly easy to use." ⊕ To get more information about how Microsoft can help turn computer challenges into a business advantage, call (800)437-3119, Dept. E6C. Or contact us at GO BIZSOLN on CompuServe.*

ULANCE

IS?

An open, graphical client-server system developed using the Microsoft BackOffice, Microsoft Office, and Microsoft development tools:

- *Microsoft Visual Basic® and Visual C++™*
- *Microsoft Access*
- *Microsoft Windows NT Server and Windows™ for Workgroups*

This system was implemented and supported by American TriTech, a Microsoft Solution Provider, and backed by Microsoft's mission-critical Product Support Services.

Microsoft®

WHERE DO YOU WANT TO GO TODAY?™

© 1994 Microsoft Corporation. All rights reserved. Microsoft, Visual Basic, Visual C++, *Where do you want to go today?*, Windows, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. *To join CompuServe, call (800) 848-8199 and ask for Rep 230.

Business units, IS benefit from sharing ideas

By Thomas Hoffman
NEW YORK

Before Mobil Research & Development Corp. makes any R&D decisions, it gathers information from a critical resource: its customers.

Mobil executives, for instance, listened to what top executives at Caterpillar, Inc. had to say about their plans for designing next-generation diesel engines. Mobil then aligned its own R&D activities to help the Peoria, Ill., construction machinery maker meet its objectives, said James R. Katzer, vice president of planning at Mobil's R&D division in Princeton, N.J.

"It's a vision of what the business people [at Mobil] see coming down the road and then bringing in the technology people to add what they have available," Katzer explained. "If you don't communicate the business strategy all the way down through the organization, you're already in trouble."

This meshing of Mobil's business and technology directives shows how organizations can better leverage their technology investments. This theme was one of the primary topics at "Justifying Technology's Value to the Bottom Line," a two-day conference held here. The gathering was sponsored by The Conference Board and the U.S. Department of Commerce Technology Administration.

At Amoco Corp., the business units and the technology division share accountability for the results of their information technology projects, said Stephen W. Ciaraldi, a planning coordinator at the petroleum giant's exploration and production division in Houston.

Because this practice is relatively new at Amoco, Ciaraldi was not able to provide much detail about early results. However, he and other conference attendees agreed that joint accountability for technology projects is worth exploring — especially if it enables companies to "kill every low-value project [that isn't succeeding] early in its life," said Andrew Brown Jr., director of information, communication, consumer research and administration at General Motors Corp.'s North American R&D center in Warren, Mich.

Hit or miss

Of course, there are times when an organization's business and technology visions are not effectively integrated, and that can result in missed opportunities, some executives said.

"We just found out that we're going to be allowed to enter the cable television industry," said Joel S. Engel, a corporate vice president at Ameritech Corp., a Chicago-based telecommunications firm.

"We should have anticipated this better by building a broadband infrastructure years ago so that 25% of our customers would be available for connection once we're given the green light," Engel added.

In some industries, such as the pharmaceutical sector, companies are being challenged by shrinking production cycles.

The average cost to develop a drug today is about $360 million. And with no guarantees of success, pharmaceutical companies are relying on information technology more than ever, said Ira C. Spector, director of research planning at Wyeth-Ayerst Research in Radnor, Pa., a division of American Home Products in Madison, N.J.

Some of the technologies that Wyeth-Ayerst Research uses to speed product development include computer-based molecular designs and chip-based screen technologies, Spector said.

Wyeth-Ayerst Research has also found that its laboratory technicians communicate their findings to one another more effectively via videoconferencing systems, he added.

"Typically, when we had an important event coming up, we would rely on a mailing to our own database as the prime vehicle for getting the information to the people we had targeted.

This time, with our Enterprise Application Development & Executive Strategy Conference, we knew we had to have a marketing approach that would jump-start awareness for the conference and educate the audience on Hewlett-Packard's Enterprise Application Development Program. We really felt we needed to create *our own* publication. A piece tailored to deliver information of real value to the customer. That, if they're building a business-critical application, the best platforms for their development are the HP 9000 Workstations and Servers.

Another important consideration was using a publication with a very broad-based appeal in the information systems arena. That's Computerworld. We know, because we asked our customers.

As a result, here we are months later, and we're still using several thousand reprints of the custom publication as a sales tool for the field, in a customer-deliverable format.

It worked very effectively in creating awareness of the conference and building preference for Hewlett-Packard programs."

"My goals were to create awareness and build a preference for Hewlett-Packard in application development. The custom publication we created certainly did that for us."

Custom Vendor Publications from Computerworld

Your Technology Solution Showcase.

Roberta Anslow
Program Manager
Hewlett Packard
Enterprise Application Development

© 1994 Computerworld Custom Publications

For more information, contact Carolyn Novack, Publishing Services Director, Boston 1-800-343-6474

INTRODUCING PCANYWHERE ACCESS SERVER. NOW YOU CAN SET UP YOUR REMOTE USERS WITHOUT EVER LEAVING YOUR DESK.

Now, the easiest-to-use remote access software is easier than ever for you to set up and install. Thanks to the new Norton pcANYWHERE Access Server.™

With Norton pcANYWHERE Access Server, you can configure all of your Norton pcANYWHERE™ Windows or DOS (4.5 or higher) users from one location. Your very own desktop.

Norton pcANYWHERE Access Server provides simultaneous remote sessions for as many as eight Norton pcANYWHERE users at one time on one server.

Which means you've just eliminated the necessity of having individual desktop hosts. And that means you can reap the full benefits of every dollar you have already invested in modems and telephone lines.

The Peter Norton Group brings centralized management to remote computing with Norton pcANYWHERE Access Server.

You can install Norton pcANYWHERE Access Server with just one disk in about fifteen minutes. You can even pre-configure user software to simplify communications with the server.

If you are a NetWare user, Norton pcANYWHERE Access Server will interact directly with the bindery, allowing you rapid access to user information.

A REMOTE SOLUTION THAT'S EASY TO USE.

Thanks to Norton Assistant, a graphical user interface and online help Cue Cards, Norton pcANYWHERE 2.0 is just as easy for your users to get up and running as it is for you to set up and configure.

Norton pcANYWHERE 2.0 requires no modification of Windows system or INI files, so your users have unmatched compatibility with all their favorite Windows applications.

A built-in File Manager automatically synchronizes user files and directories between remote and office PCs.

Virtual device drivers replace TSRs, freeing memory space and simplifying memory management.

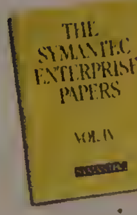
And remote drive mapping allows your users to work with files on their remote PCs without the hassle and delay of waiting for data transfers.

Make the right strategic move. Find out more about Norton pcANYWHERE Access Server and Norton pcANYWHERE 2.0 today. It's the winning remote solution.

CALL 1-800-453-1135.

Ask for Ext. 9B49 for more information and request our White Paper, Remote Access Computing in an Enterprise Network.

White Paper available in U.S. only. For more information in Canada, call 1-800-667-8661. In Australia, call 2-879 6577.



SYMANTEC.®

MANAGING THE ENTERPRISE.

Symantec is a registered trademark and pcANYWHERE Access Server and pcANYWHERE are trademarks of Symantec Corporation. All other brand names or trademarks are the property of their respective holders. ©1994 Symantec Corporation. All rights reserved.

SIEMENS
NIXDORF

RM 600 500 series 64-bit UNIX servers are designed for the largest, most demanding applications in the enterprise. Models scale from two to twenty four R4400 RISC microprocessors, with up to 4 gbytes of main memory, a terabyte of disc storage, up to 100 communications controllers, 54 intelligent I/O controllers, and hot-swapable discs, fans and power supplies.

Because all of the RM series of products use powerful MIPS RISC processors, applications will run on desktop work stations, departmental servers, clustered servers or a parallel server.

These servers are really hot.

THE RM600 HAS SOLD MORE UNITS WORLDWIDE

Siemens Nixdorf Information Systems Inc., Enterprise Systems Division,
200 Wheeler Road, Burlington, MA 01803 Tel: 1-800-SNI-RISC Fax: 617-221-0250

SPECrate_int92	
Siemens Nixdorf *RM600 64-Bit UNIX Server*	
24 Processors (maximum)	**42,532**
20 Processors	**36,964**
12 Processors	**24,757**
HP *T500*	
12 Processors (maximum)	23,717
SUN *SPARCcenter 2000*	
20 Processors (maximum)	24,864
IBM *7015-R30 & 7013-J30*	
4 Processors (maximum)	8,000

THAN HP'S T500.

RM600 64-Bit UNIX Server

Info-terrorists

CONTINUED FROM PAGE 1

"The technology is real. The capability is real," said Winn Schwartau, executive director of Interpact, a computer security consultancy in Seminole, Fla. "What has gone underrecognized is the ability to use these open source weapons to create a massive attack."

Consultant Paul A. Strassmann, the Pentagon's former director of defense information, said, "If you are a responsible company official, and you conclude that an attacker might use a HERF weapon, then your decision to put a data center with glass windows facing a busy highway may be a foolish act."

Strassmann lectures on information warfare at the National Defense University in Washington.

Corporate preparedness to deal with information warfare is abysmally low, experts agreed. "The bottom line is that the capability of the offense now exceeds that of the defense," Strassmann said. "A very small number of knowledgeable info-bandits can totally overwhelm very entrenched and expensive defenses."

No stranger to the Pentagon

The U.S. is known to have top-secret electronic weapons, and it reportedly used them with devastating effect against Iraqi communications during the Persian Gulf war. Unfortunately, according to experts who have studied the technology, it does not take a rocket scientist or a billion-dollar defense contractor to build a nasty electronic weapon.

These devices are just one source of danger to companies approaching the 21st century, experts agreed. Internet bulletin boards and underground publications such as "2600 — The Hacker Quarterly" are filled with advertisements for weapons. These include $100 libraries of computer viruses, electronic boxes built to trick telephone systems, $29 password "sniffers," spy equipment and free advice for the info-terrorist.

> "Why pay for information when you can steal it?"
>
> *—Maj. Gen. Alan Pickering, Communications Security Establishment*

"Info-assassin paraphernalia is booming, and it's gory stuff you can buy," Strassmann noted. "There is also a wide range of people available for hire to carry things out, many of them ex-intelligence agency people."

Schwartau laid out a grim smorgasbord of these devices and their info-crime applications in a recent book titled *Information Warfare — Chaos on the Information Superhighway.*

Users at the conference here were divided in their assessments of the risk from electromagnetic devices. John Pastore, infrastructure manager at Capital One Financial Services Corp. in Fairfax, Va., said security devices in his own data center had been known to disrupt processing by emitting radio frequency interference.

Pastore said he is concerned about any risk having "a small probability of occurrence but an extremely high potential cost." For example, he said if Capital One's credit-card payment processing operation was down for a single day, the company might never recover.

"You have to take [electromagnetic weapons] seriously because the capability exists," Pastore said. He refused to say whether Capital One had taken any preventive measures against the devices.

For the most part, however, users said they were skeptical of the danger from HERF guns and the like. "I don't see the risk for us," said Phyllis Unger, director of data processing at Rolls-Royce Canada Ltd. in Lachine, Quebec. "As a manufacturer, I'd have to worry more about mundane things such as theft of corporate secrets."

"Yeah, we've thought about it, but I can't say it's the sort of thing that comes up at every board meeting," shrugged Dominic A. Varvaro, supervisor of programming at CAE Electronics, Ltd. in St.-Laurent, Quebec.

Many foreign countries and corporations see cyberspace as an electronic gold mine where it is possible to operate anonymously and with relative ease and high payoffs.

"Do not assume threats are primarily from a ragtag band of hackers," said Michel Kabay, an information security specialist at LGS Group, Inc., a systems consultancy in Montreal. "At the intercorporate level, I foresee that it will be irresistible to those who are unscrupulous to cause damage to competitors through attacks on information systems."

"The end of the Cold War has boosted industrial espionage," added Maj. Gen. Alan Pickering, director general of information security at the Communications Security Establishment, Canada's equivalent of the National Security Agency.

"Why pay for information when you can steal it?" Pickering asked, noting that there are 57 countries known by the FBI to have established formal programs for spying on Silicon Valley companies.

Billions down the drain

Indeed, *The Wall Street Journal* recently reported an accusation by Texas Instruments, Inc. that France's Compagnie des Machines Bull had developed a chip based on secrets stolen by a Bull mole employed at TI. A spokesman for TI said last week that the case had been settled out of court and declined to comment further.

"Corporations are losing billions through electronic theft," said Robert Steele, president of Oakton, Va.-based Open Source Solutions, Inc., a nonprofit foundation that has lobbied the government to strengthen national information security. "IS managers today are like housing developers selling houses with leaking roofs, no windows, no doors and no alarm systems."

Steele said risks to companies include theft of proprietary information, deliberate sabotage of mission-critical systems by investors who have sold short a company's stock and sabotage by disaffected employees. He said the problems are not better known and understood because companies virtually never talk about security breaches, fearing public embarrassment and shareholder lawsuits (see story below).

Strassmann rejected the calls by some at the Montreal conference for the government to share its information warfare defense secrets with U.S. industry. He said chinks in corporate armor result from flawed policies and procedures. "The problem has nothing to do with technology and everything to do with organization," he said. "The defenders are not organized against professional attacks."

Paul A. Strassmann: *'Info-assassin paraphernalia is booming, and it's gory stuff you can buy. There is also a wide range of people available for hire to carry things out, many of them ex-intelligence agency people'*

This weapons excerpt comes from a company brochure on "Electro-Magnetic Pulse Cannons":

"The development of this technology is available for the right price. Units are well below the $500 range and can be constructed in as little as 20 days.

"The weapon is capable of firing a directed stream of enhanced electromagnetic energy with a force of over 6 megawatts and a range of 5,000 to 9,000 yards.

"This device could be placed in an operational mode for the destruction of an enemy's electromagnetic spectrum technology. This would include all but nuclear-hardened technology."

SOURCE: ENHANCED RADIATION WEAPONS TECHNOLOGIES LABORATORIES, A DIVISION OF IAM/SECURE DATA SYSTEMS, INC., GLADWYNE, PA.

The dangers of complacency

Law enforcement and security experts bemoan the lack of public discourse on the threats of information warfare.

And the result is unwarranted user complacency.

"The biggest [information] crimes being perpetrated now are those we don't hear about and won't hear about for years, if ever," said Jan Wolynski, an information security specialist with the Royal Canadian Mounted Police.

Michel Kabay, director of education for the National Computer Security Association in Carlisle, Pa., said he favors the establishment of national data banks of computer security breaches to which corporations and government agencies would be required to report incidents. Names of victims should be kept confidential, he said.

Information warfare specialists are keenly aware that they are seen as Chicken Littles by some in the mainstream user community. "It may be too early to bring company executives into this. If we move too quickly, we will turn them off," said Maj. Gen. Alan Pickering, a Canadian information warfare expert. "I'm constantly challenged — 'Who's been hit? Show me the risk.' "

Yet Pickering and other experts insist that anyone who dismisses threats just because they cannot be documented with extensive case histories is living in a fool's paradise — and sitting on a time bomb to boot.

"If you take the position that danger is based on potential, then clearly you have to say we are just lucky or stupid," said Paul Strassmann, a former CIO and military expert. *—Gary H. Anthes*

“PCs have all the same feeds and speeds. They’re a commodity.”

(Alert product development, we must be going about this all wrong.)

IBM PC 700: Pentium™ 75, 90 or 100MHz processors; SelectaBus™ PCI/ISA or PCI/MCA architecture; 8–192MB RAM w/256KB–1MB L2 cache; SVGA local bus 64-bit graphics; fast SCSI hard drives; multimedia capable; EasyTools software with Rapid Resume™ and Wake-up on Ring; NetFinity™ systems management and security; 3-year warranty.[2] Monitor stand optional.

Presenting the IBM PC 700.

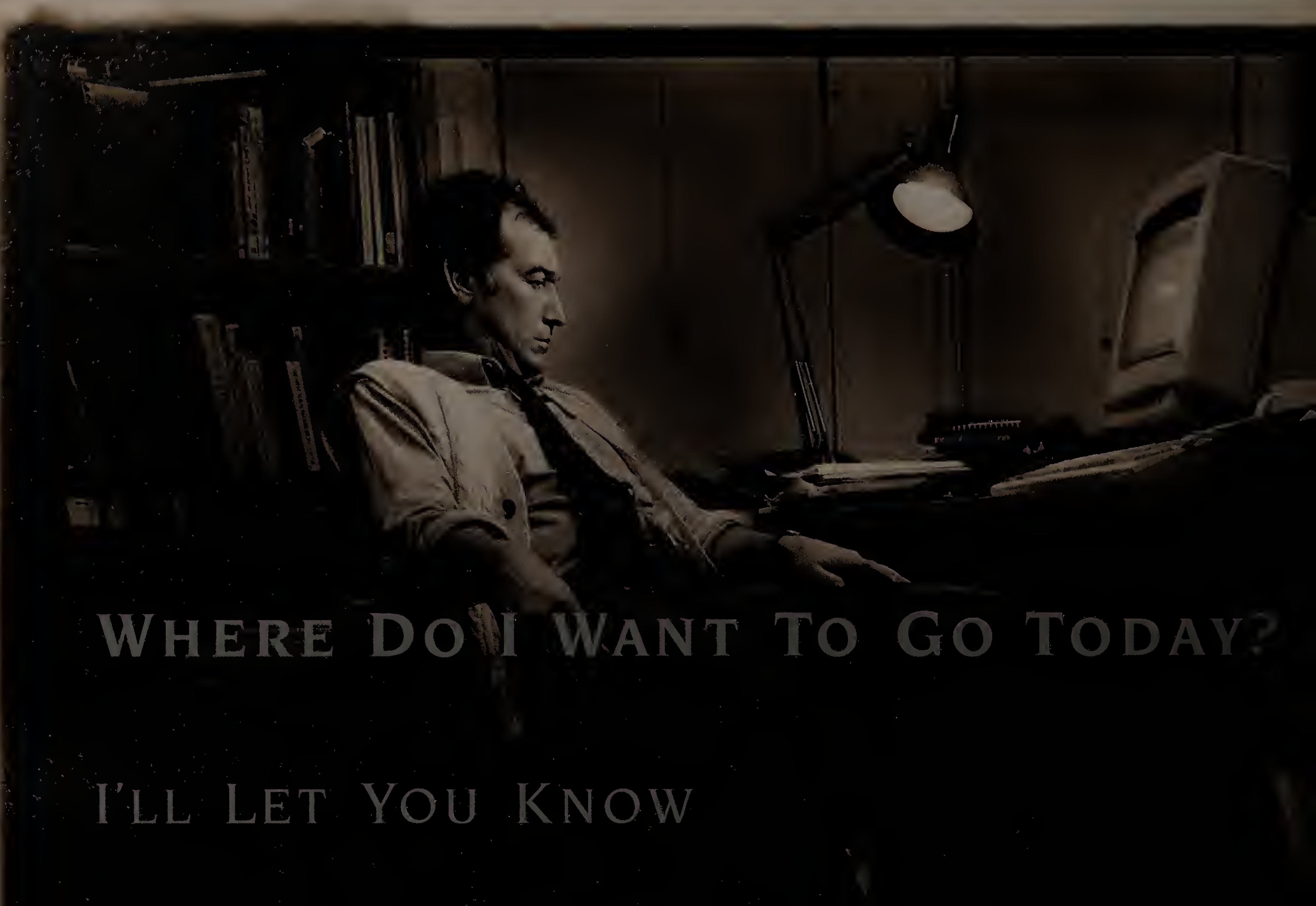
Just a few questions for anyone who thinks PCs are a commodity: Can your PC automatically turn itself on for a fax? Can it boot up to the exact spot you were at when you turned it off? Does your PC warn you when your hard drive gets too full? Does your helpline answer in an average of less than three minutes?[1] If all PCs are the same, why do user surveys show such differences in reliability and user satisfaction?

There is a difference in PCs: IBM PCs are better. And the IBM PC 700s are the best ever. IBM offers a broad range of models with Pentium processors, and there is no clearer choice for mission-critical applications and complex, networked environments.

For more information by fax, call 1 800 IBM-4FAX (key-in ID# 1776). Or visit your IBM Authorized Business Partner.

There is a difference™ IBM

[1] Source. Research International survey of six leading PC manufacturers' helplines, 8/94. [2] IBM's Statement of Limited Warranty available on request (call 1 800 772-2227). IBM is a registered trademark and SelectaBus, Rapid Resume, NetFinity and There is a difference are trademarks of International Business Machines Corporation. Pentium is a trademark of Intel Corp. © 1995 IBM Corporation.



*In Canada call **1-800-GO-LOTUS.** © 1995 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, Working Together, 1-2-3, SmartSuite, Ami Pro, Freelanc

The most complete suite:

The most advanced integration with Lotus Notes®
The only workgroup spreadsheet
The fastest word processor
The only user-friendly database
The easiest presentation graphics
The leading personal information manager

At Lotus,® we develop software that works the way real business works. That's the idea behind SmartSuite® 3.0. Five integrated applications that let you access and analyze information, compose your thoughts, present your ideas, organize your business. And powerful workgroup features that let you do all this in collaboration with your co-workers.

SmartSuite is 1-2-3® spreadsheet, Ami Pro® word processor, Approach® database, Freelance Graphics® and Organizer™ personal information manager for just $299. For a free trial version just call **1-800-TRADE-UP, ext. A447*** for the Lotus Product Gallery CD.

Lotus
Working Together®

aphics. Lotus Notes, and Approach are registered trademarks and Organizer and NotesReady are trademarks of Lotus Development Corporation. Where do you want to go today? is a trademark of Microsoft Corporation.

Israel aims to export high-tech expertise

IS suppliers renew push for overseas presence

By Paul Gillin

Having established diplomatic ties with former enemies, the state of Israel is turning its attention to another daunting challenge: building mind share in the U.S. computer market.

Israeli high-tech executives hope to strike while the iron is hot. The end of the Arab boycott has loosened some countries' long-standing policies against doing business with Israel. The first-ever delegations from Jordan, South Korea and Japan were kicking tires at the Israel Information Processing Association show earlier this month, and "all the major European companies are coming to investigate" Israeli technology, said Hanan Achsaf, managing director at Motorola Israel Ltd. in Tel Aviv.

> Israel faces a dilemma: It has ample intellectual capital to export abroad but little money to do so.

Small giants

But the small size of the Israeli market — in which a $150 million company is a comparative giant — has been a hindrance to Israeli ambitions. The country faces a dilemma: It has ample intellectual capital to export abroad but little money to do so.

"It's definitely not a smooth [process], penetrating this market," said David Salton, Boston-based Israeli economic consul to New England. Salton, who advises Israeli companies on how to enter the U.S. market, said these companies are looking to partner in order to build market share rapidly and skirt the high costs of building a sales force.

Sapiens International Corp. entered the U.S. market in 1991 after building a critical mass of cash in Europe, according to Peter Barber, senior vice president at Durham, N.C.-based Sapiens USA, Inc. And even then, "We didn't come here until we had established a fairly strong relationship with a VAR who could support us — in this case, IBM," he said.

Israeli companies are not new to the IS community: Firms such as Scitex America Corp., Sapiens and Fibronics International, Inc. are well established in the U.S., and more than 50 Israeli companies are traded on U.S. stock markets. But there is a renewed push by the $4.6 billion Israeli electronics industry to build an overseas presence.

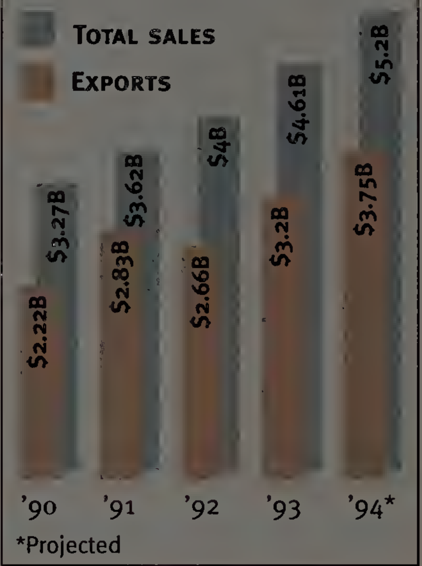
The government is prodding the effort with encouragement and money, although the amounts are modest. Promising research and development projects can get risk-free government funding, and venture capital companies can apply for government loans to fund up to two years' start-up costs for high-tech ventures.

The government-backed Binational Industrial Research and Development Foundation is backing 13 joint U.S./Israeli R&D efforts, including a two-way paging system being jointly developed by American Paging, Inc. in Minneapolis and Nexus Telecommunication Systems Ltd. in Israel. Another project is a bridge/router that will link LANs to Asynchronous Transfer Mode switches, a joint effort of Fore Systems, Inc. in Warrendale, Pa., and Lannet Data Communications Ltd. in Tel Aviv.

The key is to leverage the impressive brainpower but on a budget. Israel ranks first in the world, both in number of engineers and scientists as a percentage of the population and in R&D expenditures per capita. And in the past five years, Israel has benefited from an influx of nearly 400,000 Eastern Europeans, many of whom have ample technical skills.

At Digital Equipment Corp.'s Negev Software Industry subsidiary in the Negev, a team of 40 Russian immigrants develops software testing tools for use throughout Digital's worldwide operations. Yigal Bar-Yossef, managing director at Digital Israel, said the company has been flooded with applications from skilled Eastern European computer specialists who will work for modest pay. The government even picks up the first year's salaries for the immigrants.

Orckit Communications Ltd., a Tel Aviv-based R&D foundry, uses technology developed for the defense industry to build core networking protocols for the information superhighway. Late last month, the company delivered a prototype of a technology that supports 8M bit/sec. data transfer over standard copper wiring. The technology could allow local telephone companies to deliver video-on-demand to homes without rewiring.



Looking across the sea

As exports have risen, the output per Israeli electronics employee has tripled to $126,000 since 1983

*Projected

Source: Israeli Association of Electronics Industries, Tel Aviv

International briefs

IBM's microkernel goes to Japan

Komatsu Ltd., Japan's largest producer of heavy industrial equipment, has signed an agreement that lets it use and enhance **IBM**'s microkernel technology for factory automation systems. Komatsu plans to integrate real-time control functions into commercial operating systems to run on PowerPC-based systems. This is the third deal IBM has signed for its microkernel technology; the others are with Digital Equipment Corp. and Korean-based hardware maker Goldstar.

Commission emphasizes research

The new 20-member **European Commission**, the members of which assumed five-year posts last week, backs making information technology research a priority. Edith Cresson, research and development commissioner, told the European Parliament earlier this month that it should use some of the $9.6 billion set aside for research to back high-priority projects in information technology.

SHORT TAKES **Siemens/Nixdorf Informationssysteme AG** in Germany has agreed to purchase San Jose, Calif.-based enterprise server vendor **Pyramid Technology Corp.** for $207 million. . . . **Hewlett-Packard Co.** has officially begun operations in the Philippines, opening an office in Manila earlier this month. At the same time, IBM said it will soon introduce a set of value-added network services, including Internet access, in that country.

Automotive engineering services

Engineering company opens borders with new videoconferencing system

By Mary Brandel

When it comes to international automotive engineering services, Detroit-based Modern Engineering wants to be in the driver's seat.

The company, which is a division of CDI Corp., a billion-dollar temporary service provider in Philadelphia, has traditionally worked with Ford Motor Co., General Motors Corp. and Chrysler Corp.

But that was before Jose Dedeurwaerder became chief executive officer in November 1993. As the former executive vice president of Renault France, Dedeurwaerder came to Modern Engineering with the clear goal of reaching beyond U.S. borders.

Changing methods

"When he started, he told us, 'There are people making a lot more cars than in Detroit,'" said Ed Pallo, executive manager of information support services at Modern Engineering. And "he expressed the clear requirement that he wants to see people when he's talking to them," particularly during negotiations, Pallo said.

That is where videoconferencing came in. The company already uses a room-based system from Compression Labs, Inc. in San Jose, Calif., to conduct meetings among 15 Detroit locations. It just completed an Integrated Services Digital Network hookup with its new office in Paris. "It's not like watching cable TV, but it's amazing how clear it is," Pallo said. Argentina is next.

After that, he said, Modern Engineering will videoconference with "whoever has similar communications and equipment that's compatible." The key component of the Compression Labs system is that it meets domestic as well as international communications standards, Pallo said.

Modern Engineering is not alone in its urge to go international.

Going global

"As the major automotive companies have continued to evolve the idea of 'world cars,' they've felt an increasing need to . . . provide engineering services on a global basis," said John Walthausen, an analyst at C L King & Associates in Albany, N.Y. World cars, he explained, are designed to be sold in any country without modification. Although the trend has existed for "a while, it hasn't been easy to do because of the variety of particular preferences," he said.

"There is a great need for technical engineers to talk to one another," Pallo agreed. However, he added, the system would also be used for statements and business documents "so we're not doing everything through [international mail] or faxing."

Fill it out. Fax it in.

COMPUTERWORLD
Future desktop decisions loom
COMPUTERWORLD
Salary and Job Satisfaction Survey
'94-'95
Hot off the press! 1994–1995 edition

51 issues for only $~~4~~8. Now Only $39.95

FAX NO. 614-382-1058

Yes, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $39.95* per year - a savings of $8.00 off the basic subscription price. Plus, I'll also receive the new '94-'95 COMPUTERWORLD Salary Survey FREE just for trying COMPUTERWORLD.

P/Code 98

First Name MI Last Name

Title Company

Address City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: $48 per year

* U.S. Only. Canada $95, Mexico, Central/South America $150, Europe $295, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medical/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Dist./ Retailer
   - 95. Other__________ (Please Specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Network Sys., Data/Tele. Comm., LAN Mgr. /PC Mgr., Tech Planning, Admin. Services
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Programming Management, Software Developers
   - 41. Engineering, Scientific, R&D, Tech. Management
   - 60. Sys. Integrators/VARs/Consulting Management

   CORPORATE MANAGEMENT
   - 11. President, Owner/Partner, General Manager
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   - 51. Sales & Mktg. Management
   - 70. Medical, Legal, Accounting Management

   OTHER PROFESSIONAL MANAGEMENT
   - 80. Information Centers/Libraries, Educators, Journalists, Students
   - 90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)

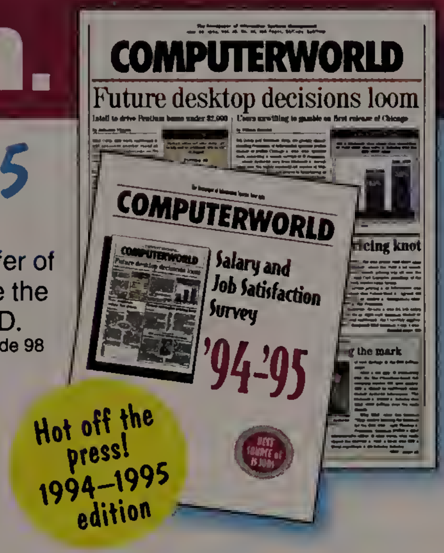
   Operating Systems
   - (a) Solaris
   - (b) Netware
   - (c) OS/2
   - (d) Unix
   - (e) Mac OS
   - (f) Windows NT
   - (g) Windows
   - (h) NeXTstep

   App. Development Products ☐ Yes ☐ No
   Networking Products ☐ Yes ☐ No

COMPUTERWORLD

E4505-8

Fill it out. Fax it in.


COMPUTERWORLD
Future desktop decisions loom
COMPUTERWORLD
Salary and Job Satisfaction Survey
'94-'95
Hot off the press! 1994–1995 edition

51 issues for only $~~4~~8. Now Only $39.95

FAX NO. 614-382-1058

Yes, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $39.95* per year - a savings of $8.00 off the basic subscription price. Plus, I'll also receive the new '94-'95 COMPUTERWORLD Salary Survey FREE just for trying COMPUTERWORLD.

P/Code 98

First Name MI Last Name

Title Company

Address City State Zip

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate:$48 per year

* U.S. Only. Canada $95, Mexico, Central/South America $150, Europe $295, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medical/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Dist./ Retailer
   - 95. Other__________ (Please Specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - 19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Network Sys., Data/Tele. Comm., LAN Mgr. /PC Mgr., Tech Planning, Admin. Services
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Programming Management, Software Developers
   - 41. Engineering, Scientific, R&D, Tech. Management
   - 60. Sys. Integrators/VARs/Consulting Management

   CORPORATE MANAGEMENT
   - 11. President, Owner/Partner, General Manager
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer

   DEPARTMENTAL MANAGEMENT
   - 51. Sales & Mktg. Management
   - 70. Medical, Legal, Accounting Management

   OTHER PROFESSIONAL MANAGEMENT
   - 80. Information Centers/Libraries, Educators, Journalists, Students
   - 90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)

   Operating Systems
   - (a) Solaris
   - (b) Netware
   - (c) OS/2
   - (d) Unix
   - (e) Mac OS
   - (f) Windows NT
   - (g) Windows
   - (h) NeXTstep

   App. Development Products ☐ Yes ☐ No
   Networking Products ☐ Yes ☐ No

COMPUTERWORLD

E4505-8

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-2144

Briefs

Lotus reports loss

Lotus Development Corp. reported a loss of $20 million for its fiscal year 1994, compared with a $55.5 million profit in 1993. The Cambridge, Mass.-based developer also announced a $14.4 million profit for the fourth quarter, ended Dec. 31, a 51% drop from the $29.6 million profit reported for the same period in 1993. Revenue for the quarter declined from $278.3 million in 1993 to $264.5 million. The company attributed the decline to reduced DOS business and competition from Windows suites.

Unisys takes a hit

After taking a $186.2 million pretax charge to cover the elimination of 4,000 positions, **Unisys Corp.** reported a loss of $52.3 million for its fourth quarter, ended Dec. 31. Excluding the special charge, the computer maker earned income of $80.8 million in the quarter. Revenue increased slightly to $2.12 billion, compared with $2.1 billion for the same period last year. Total revenue for the year was $7.4 billion, essentially flat from the $7.42 billion reported last year. Unisys reported net income of $100.5 million for the full year.

Gupta loses $23.9M

Gupta Corp. in Menlo Park, Calif., blamed high sales and marketing costs for the $23.9 million loss reported last week for its fiscal year 1994. In 1993, the company reported $5.6 million in profits. However, revenue rose from $56.1 million in 1993 to $64.5 million in 1994.

SHORT TAKES **Rational Software Corp.** in Santa Clara, Calif., has acquired **Palladio Software Corp.**, an object-oriented tools developer. . . . **Harbinger EDI Services, Inc.** in Atlanta bought **Texas Instruments, Inc.**'s electronic data interchange business unit. All affected TI employees will stay on with Harbinger.

IBM comes out on top in 1994

Amdahl also reports bully fourth-quarter profits while StorageTek, Stratus fall

By Craig Stedman

Forget for a moment about IBM's troubled PC business and you could almost festoon the computer giant with a juggernaut label. Even if you put IBM PC Co. back in the picture, IBM's string of five straight profitable quarters has helped buck up the confidence level of some big customers.

IBM in Armonk, N.Y., came out at the high end of Wall Street forecasts once again in the fourth quarter of 1994, giving it a grand slam for the year. Last week, the company reported a $1.2 billion profit on revenue of $19.9 billion for the quarter, earning the continued praise of users and analysts.

"I don't know if you can say for sure that IBM has turned things around, but they're sure looking a lot better than they were a year ago," said Wayne Pattison, director of data center operations at Kansas City Southern Railway Co. in Missouri.

User confidence rises

George Sekeley, president of the information systems unit at CSX Corp. in Richmond, Va., said he also likes IBM's performance. "I have confidence now that they've found a way to get out of the hole that they got themselves into," he said.

IBM's fourth-quarter profit was three times better than its 1993 figure of $382 million, and revenue grew 7% after adjusting for the sale of its federal division. For all of 1994, revenue increased 6%, to $64.1 billion, and IBM had a net profit of $3 billion. That compares with a 1993 $8.1 billion loss.

Mainframe revenue continued to hold up better than expected, falling less than 10% in 1994, IBM said. The AS/400 midrange line rebounded after several flat years, and the RS/6000 had strong double-digit growth. The PC Co., however, had only a 7% sales increase and was unprofitable.

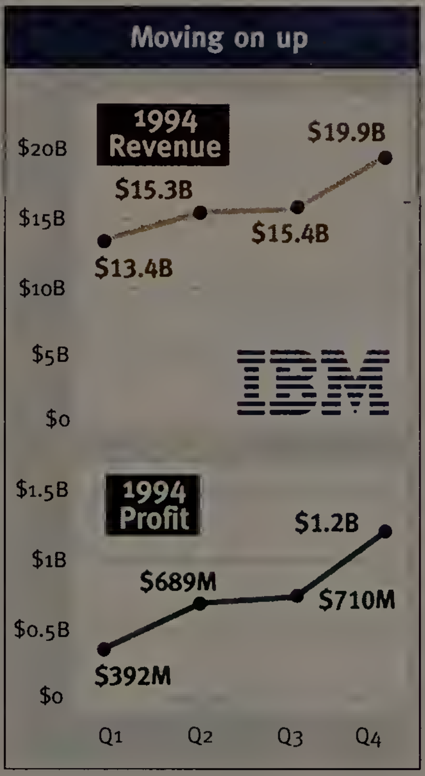
The PC Co.'s results were described as "disappointing" by Jerome York, IBM's chief financial officer. "This is one-sixth of our business, and it's underperforming materially," he said. An ongoing restructuring at the PC unit will not be completed until midyear, he added.

IBM this year has to show that it can still successfully merchandise PCs, said John Jones, an analyst at Salomon Brothers, Inc.'s San Francisco office. Nonetheless, for the fourth straight quarter, Jones has raised his 1995 profit forecast for IBM as a whole.

Amdahl Corp., one of IBM's mainframe brethren, also reported strong fourth-quarter results due to better-than-expected big iron sales. Amdahl in Sunnyvale, Calif., had a $40.9 million profit on revenue of $498.8 million, compared with a $40.9 million loss and revenue of $442.9 million a year ago.

Not so fortunate was Storage Technology Corp. in Louisville, Colo. StorageTek's fourth-quarter profit of $28.1 million was a big increase over the $6.3 million figure from last year, but it fell well short of expectations due to low sales of its Iceberg 9200 mainframe disk array.

Stratus Computer, Inc. in Marlboro, Mass., also reported disappointing results, with sales of its fault-tolerant systems up just 2%. It also said 1995 revenue would be flat with 1994 levels or down slightly. Stratus and StorageTek were hit with big stock price declines after releasing their numbers.


Moving on up

Information highway

Microsoft readies on-line net strategy

By Ellis Booker

Microsoft Corp.'s impending entry later this year into the on-line network business has already begun to affect the on-line industry.

While The Microsoft Network will not be available until the much-delayed Windows 95 operating system ships in August, "it stands to be a sledgehammer if they get just 5% of all the Windows 95 users on-line," predicted Jayne Levin, editor in chief of the "Internet Letter" in Washington.

Windows 95 is expected to sell 20 million to 30 million copies in its first year.

However, Microsoft is not commenting on the potential traffic, the pricing scheme or the content providers of the network. But sources say it will be launched as an X.25 service, with TCP/IP connections to the Internet expected to added by the end of the year. Sources indicate that Microsoft expects to sign up 2 million users initially, scaling to 20 million well before the end of the decade.

The power of Microsoft

Meanwhile, Microsoft has been busy forging strategic alliances.

Bill Gates, Microsoft's chairman and chief executive officer, announced recently that UUNet Technologies, Inc. in Falls Church, Va., will build a dedicated TCP/IP network through which Microsoft Network subscribers will access the Internet via Integrated Services Digital Network (ISDN) lines. The network will support modem speeds of 14.4K to 28.8K bit/sec.

"In one fell swoop, Microsoft will do more for ISDN than the telephone companies have done in 10 years," said Don Gooding, a partner at Accel Partners in Princeton, N.J.

Microsoft also licensed the code for the Mosaic graphical browser from Spyglass, Inc. in Naperville, Ill. Spyglass is the developer of Enhanced Mosaic, a commercial-grade version of the browser developed at the University of Illinois.

And earlier this month, Microsoft licensed a text-retrieval engine from Fulcrum Technologies, Inc. in Ottawa for enabling members to navigate through content on the service.

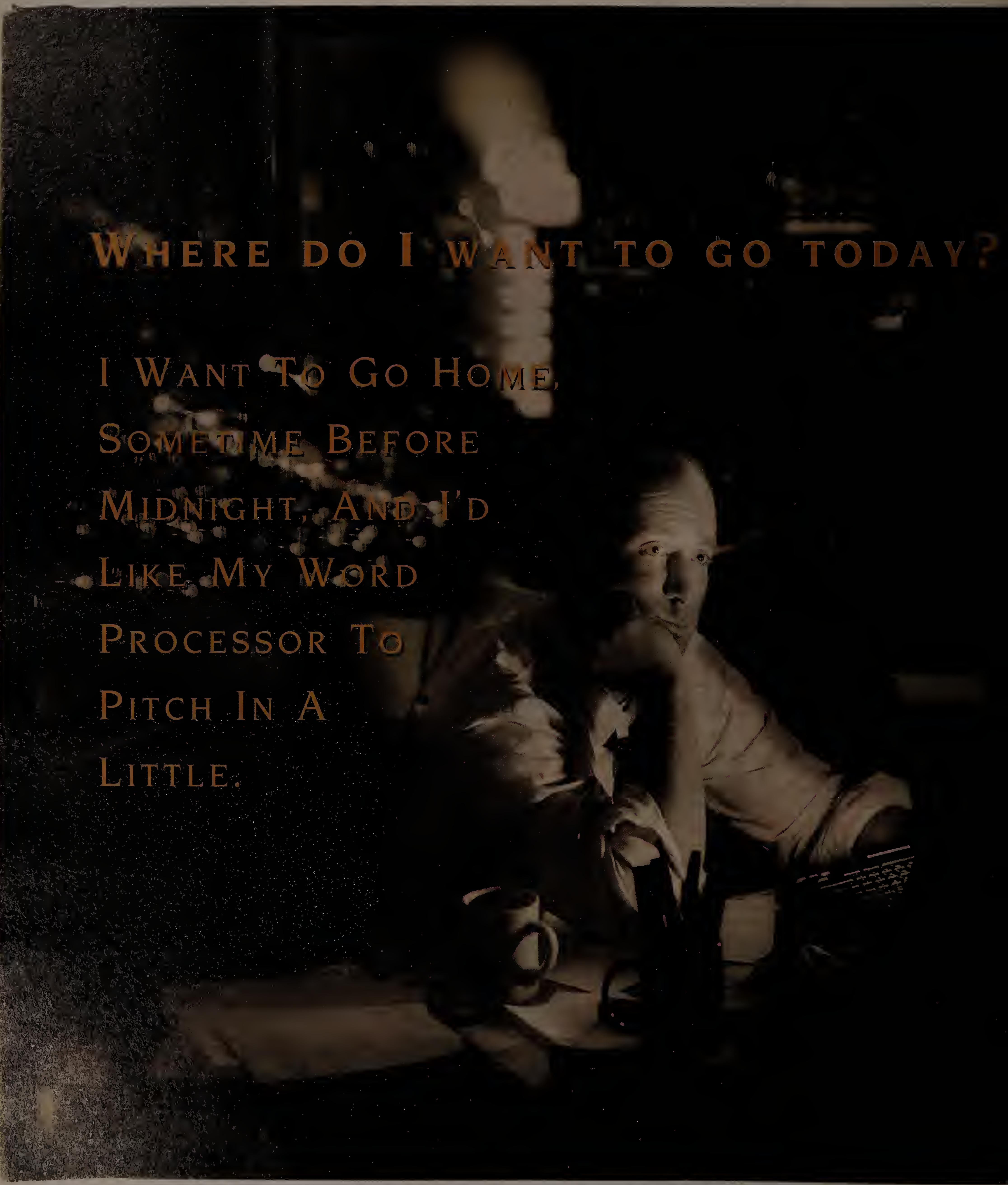
There is a general consensus that Microsoft's addition of Internet connectivity via its network will push the Internet over the top and into the mainstream.

But other players are not rolling over and playing dead.

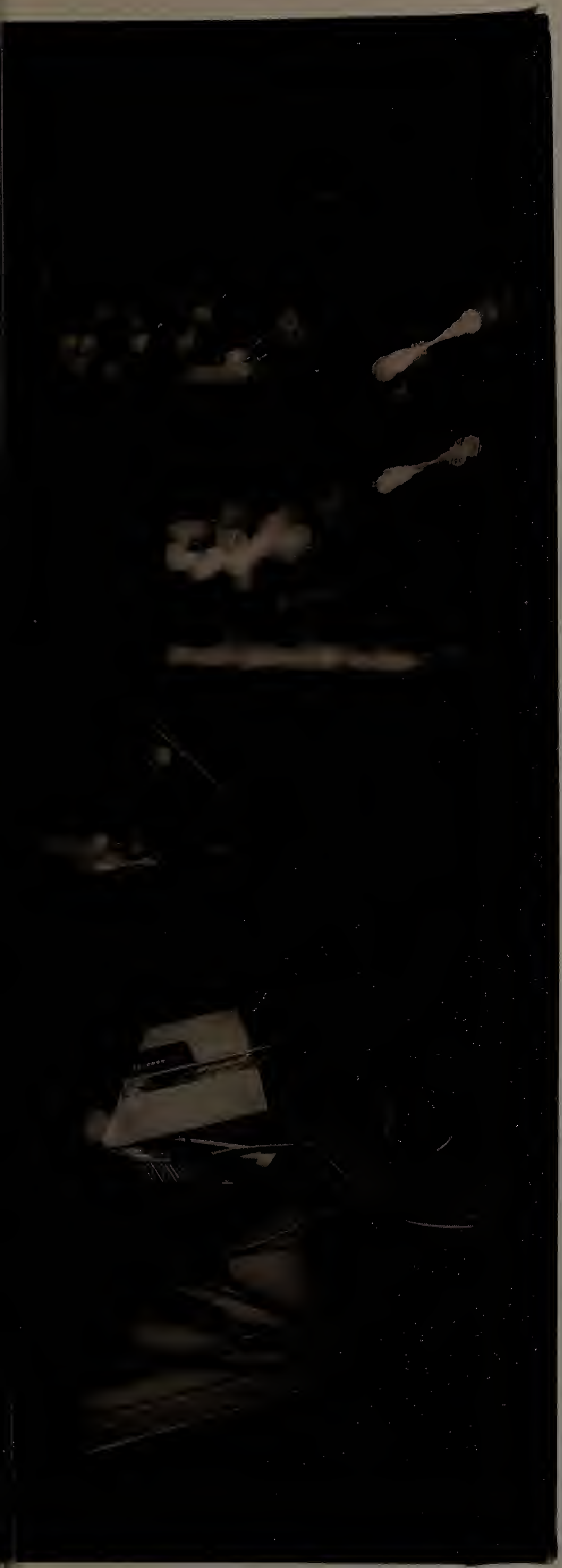
The proprietary on-line networks — led by Prodigy, which announced a browser for the World-Wide Web earlier this month — are rapidly deploying Internet connectivity and browsers.

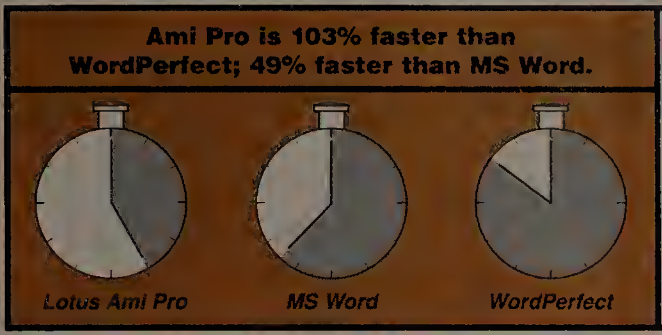
Danger looms

Even if The Microsoft Network starts with 2 million users, it would be an enormous threat to services such as CompuServe, America Online and Prodigy. These proprietary on-line networks, led by CompuServe, have a combined 4.7 million users today, according to analysis by Forrester Research, Inc. in Cambridge, Mass.



*In Canada call **1-800-GO-LOTUS.** †NSTL Report on Word Processor Performance June 1994 © 1995 Lotus Development Corporation 55 Cambridge Parkway Cambridge MA 02142 All rights reserved. Lotus, Ami Pro, 1-2-3, Freelance Graphic




Ami Pro is 103% faster than WordPerfect; 49% faster than MS Word.
Lotus Ami Pro
MS Word
WordPerfect

Lotus® Ami Pro® is the fastest Windows™ word processor. No exceptions. According to NSTL testing, real people doing real business tasks finish them more quickly with Ami Pro than they do with MS Word or WordPerfect (49% and 103% faster respectively, on a 386 machine with 4MB RAM, to be specific).† Everything about Lotus Ami Pro is designed for speed. Features work the way you expect them to. Putting a 1-2-3® chart into Ami Pro or moving Ami Pro text into a Freelance Graphics® presentation is faster. And Ami Pro's workgroup features facilitate sharing and collaborating with colleagues.

In short, Lotus Ami Pro doesn't make you type faster -- it helps you work faster. Try Ami Pro, and the rest of Lotus SmartSuite,® free for 45 days. Just call **1-800-TRADE-UP, ext. A485*** for the Lotus Product Gallery CD.

Lotus
Working Together®

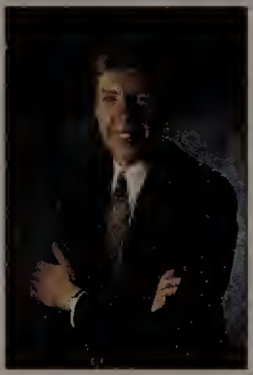
nartSuite and Working Together are registered trademarks and NotesReady is a trademark of Lotus Development Corporation. Windows and Where do you want to go today? are trademarks of Microsoft Corporation.

Editorial

Give Kahn credit

Borland Chairman Philippe Kahn is getting pounded in the press these days, as well he should. Having made his name synonymous with the company he heads, he has chosen to become the fall guy for Borland's misfortunes. But let's not forget what Kahn and his company have done for the software industry and software users.

The image of Kahn that stands out most in my mind is on a sweltering August day in Washington two years ago, when about 500 excited PC buffs watched him demonstrate the new Quattro Pro for Windows Version 5. He captivated the audience for 45 minutes. At the end, a sweat-drenched Kahn brought down the house by giving away a free shrink-wrapped copy of the spreadsheet to everyone in attendance.



You can call it a marketing stunt, but to the computerphiles in the hotel ballroom that day, Philippe was a hero. They were asking him for his autograph, for heaven's sake.

Borland and its customers have enjoyed a shared respect based on the notion that they followed a different drummer. The company has pioneered some major customer-oriented policies.

Borland broke into the market in 1984 when the typical business software package cost more than $400 and bore onerous copy protection schemes that basically told the buyer: "We think you're a crook." Its Turbo Pascal and Sidekick were feature-rich software that cost less than $100. And Borland shipped both products without copy protection, choosing instead a simple license agreement that essentially stated that the vendor trusted users to do what was right.

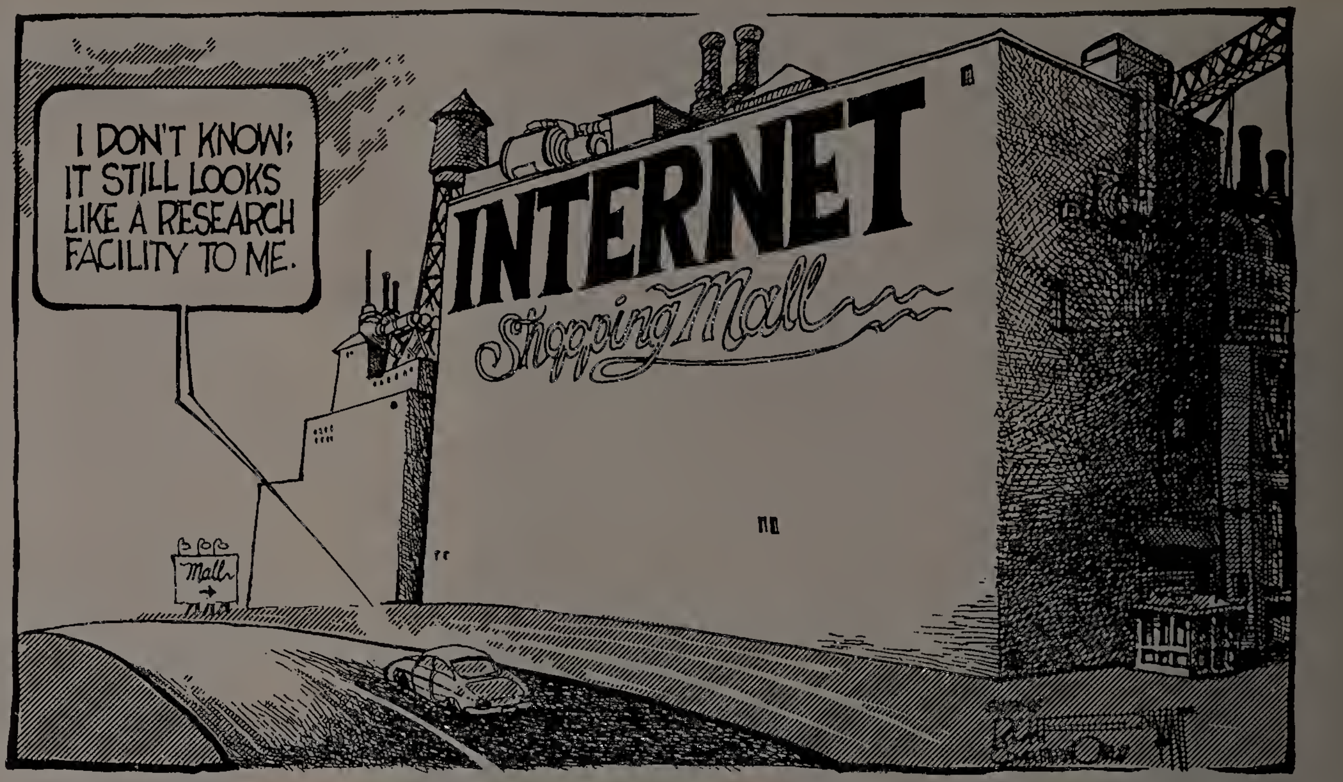
The approach irritated the software establishment, but it wasn't long before competitors followed Borland's lead. Today, copy protection is a dusty relic, and pricing is lower than ever. Licenses are simpler, too.

Even Borland's product flops have portended some important industry trends. It was one of the first major PC software makers to offer volume site licensing. Its ill-fated Turbo Lightning introduced the now-common concept of "as-you-type" spell checking. The defunct Sprint word processor featured a choice of interfaces long before Lotus and WordPerfect adopted the ideas for their Windows products. And ObjectVision was a first stab at visual object programming.

Those accomplishments don't excuse the many mistakes of the past three years, but the problems shouldn't overshadow the contributions the company has made to the industry and its customers. The PC software business is better today because Borland and Philippe Kahn were there.

Paul Gillin

Paul Gillin, *Editor*
Internet: *pgillin@cw.com*


I DON'T KNOW; IT STILL LOOKS LIKE A RESEARCH FACILITY TO ME.
INTERNET
Shopping Mall
Mall

Letters to the editor

More sensitivity to women needed

Having just read *Computerworld*'s Forecast issue [CW, Dec. 26/Jan. 2], which looks at "how far we have come in the past 12 months," I found myself frustrated by the scarcity of women featured. Feeling that undue sensitivity on the subject was affecting my judgment, I decided to analyze the incidences of male/female images in this issue.

Of 103 human images, 87 are male (84%), and 16 are female (16%). These numbers break down as follows: 88% to 12% in the main text; 70% to 30% in the advertisements; and 96% to 4% in the graphic illustrations.

The fact that the numbers in the advertisements are slightly more balanced indicates that perhaps your advertisers have a better appreciation of the importance of women in the computer industry than does your editorial staff.

On behalf of the female members of the information technology industry, could I ask that you please address this issue by showing more sensitivity toward a group that is no longer a minority?

Pamela A. Gray
Mill Valley, Calif.

Time to change

Regarding "Big Blue deja vu" [CW, Jan. 16], IBM's frequent reorganizations have always reminded me of a palm tree swaying in a storm. With every reorganizational gust, a few coconuts fall from the top, but nothing affects its firmly planted roots where the employees continue to nourish the rest of the tree.

IBM needs a visionary focus that leads to the development of new and widely accepted software applications, such as workflow, office, image processing, multimedia, personal finance and networking. Additionally, its software approach requires programs that use lots of productive MIPS, work together harmoniously and support IBM's operating environments. More simply stated, it must emulate Microsoft's strategy for the Windows operating system.

Robert Wintermeier
Groton-on-Hudson, N.Y.

Intel misled users with false claim

Mitch Betts laments that there are no "well-vetted algorithms," and he suggests computer buyers start asking vendors harder questions and demanding more rigorous testing and validation of the algorithms embedded in microprocessors and software ["Pentium flaw joins long list of computer math mistakes," CW, Dec. 19, 1994]. No one I have ever known who has depended on numerical calculations has naively believed that the calculations done by their computers are absolutely correct.

However, when a vendor states that its processor is IEEE-compliant, it is saying the errors are absolutely predictable — *not* that there are no errors. Intel said its chip was IEEE-compliant and continued shipping it for several months when it knew this was not the case.

Franklin H. Williams Jr.
Salt Lake City

Oncolink is a valuable resource

I was pleased to see the coverage you gave to the Oncolink matter in "Unplugged Internet board incites debate" [CW, Dec. 19, 1994].

In the article, Daniel Dern was quoted as saying: "At the moment, the Internet is one of the world's largest homes of freely available information, but much of it is also inaccurate and out of date."

As a cancer survivor and a frequent visitor to Oncolink, I have always found Oncolink material to be the most accurate and up-to-date information source available, not to mention comprehensive and convenient. Oncolink is truly an invaluable resource. I hope it remains so.

Barb Kirkpatrick
St. Paul, Minn.

BEST COMPUTER NEWSPAPER
1992, 1993
COMPUTER PRESS ASSOCIATION

■ Computerworld welcomes comments from its readers. Letters may be edited and should be addressed to Bill Laberis, Editor in Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Editor
Paul Gillin

News Editor
Maryfran Johnson
Sections Editor
James Connolly
Assistant News Editor
Patricia Keefe
Assistant Sections Editor
Johanna Ambrosio
Technical Editor
Charles Babcock
Senior Editors
Craig Stedman, Large Systems
Ed Scannell, PC Software
Michael Fitzgerald
Mobile Computing
Rosemary Cafasso
Client/Server Software
William Brandel, PC Software
Laura DiDio, Networking
Elizabeth Heichler
Application Development
Mid-Atlantic Bureau
Thomas Hoffman, User Strategies
(201) 587-0090
Julia King, Management
(215) 532-7599
Washington, D.C., Bureau
Mitch Betts, Social & Legal Issues
(202) 347-6718
Gary H. Anthes, Government & Security
(202)347-0134
West Coast Bureau
Jean S. Bozman, Open Systems
Kim S. Nash, Databases
Steve Moore, Networking
(415) 347-0555
Midwest Bureau
Ellis Booker, Networking
(708) 827-4433
Pacific Northwest Bureau
Stuart J. Johnston, PC Software
(206) 641-7770
Senior Writers
Mary Brandel, Neal Weinberg,
Stephen P. Klett Jr., Jaikumar Vijayan
West Coast Bureau
Mark Halper, Suruchi Mohan
(415) 347-0555
New Products Writer
Tim Ouellette
Research Coordinator
Stefanie McCann

Features Department
Senior Editors
Michael L. Sullivan-Trainor, CW Guide
Joseph Maglitta, Corporate Strategies
Lory Zottola Dix, In Depth
Allan E. Alter, Management
Kathleen Gow, In Depth
Associate Editors
Jodie Naze, Careers and Marketplace
David B. Weldon, Management
Cathleen Gagne, CW Guide
Senior Researcher
Kevin Burden, Firing Line/Scorecard
Assistant Researcher
Erin Callaway, Resource Center

Special Projects Editor
Bruce Rayner
Managing Editor, Special Projects
Joyce Chutchian-Ferranti

Senior Research Manager
Bob Fink

Chief Copy Editor
Anne McCrory
Assistant Chief Copy Editor
Christina Aicardi Maguire
Senior Copy Editors
Kimberlee A. Smith, Jill Zolot
Ellen Fanning
Copy Editors
Michelle J. Keyo, Jay F. Rizoli
Kimberly Gilliard, Michelle Grabon

Design Director
Tom Monahan
Senior Graphic Designers
Nancy Kowal
Mitchell J. Hayes
Graphic Designers
Janell Genovese, Mary Beth Welch,
David Waugh
Cartoonist
Rich Tennant

Office Manager
Linda Gorgone
Editorial Assistants
Lorraine Witzell, Connie Brown
Aleksandra Skulte
West Coast Bureau
Chris Flanagan

Computerworld Client/Server Journal
Alan Alper, Editor
Catherine McCrorey, Managing Editor
Stephanie Faucher, Graphic Designer

Electronic Marketplace Liaison
Lisa Davidson

Rights and Permissions Manager
Sharon Bryant

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
(508) 879-0700
TDD: (800) 428-8244
MCI Mail: 279-6273
CompuServe: 76537,2413
Subscriptions: (800) 669-1002

Open season on CIOs

Michael B. Cohn

CIOs, beware of footsteps. Hide under your desk. It's open season on information systems executives, and you may be the next to go.

Today's chief information officers are moving up or out at an alarming rate. A handful climb into the boardroom; the rest race riotous mobs of users to the parking deck.

Fact is, every 30 minutes in corporate America a CIO is fired, demoted or made fun of. The job is cruel, brutal and thankless and requires resilience and dedication found only in such pillars as major league baseball negotiators.

CIOs, you need to know where you stand. Are you on the cutting edge of corporate technology or just six figures waiting to be sliced? Should you think about a raise or work on a resume? It's time for a gut check. Just take the following test, run the answers by your CEO, and hope, with fingers crossed, he at least remembers your name.

You may begin

Which of the following describes you?

1. You have read about client/server technology and are trying to understand it.

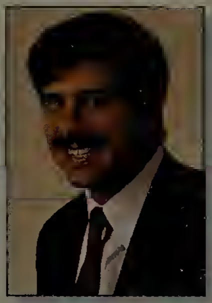
You understand client/server and are trying to employ it.

You don't understand client/server and are looking for employment.

2. You purchase equipment from multiple vendors.

You purchase equipment from just one vendor and hope it learns your business.

You purchase equipment from just one vendor and pray it stays in business.



Your answers could determine if you should think about a raise or work on a resume.

3. Your chief financial officer will still let you cool with water.

Your CFO demands you get off water.

Your CFO demands you walk on water.

4. You read 20 hours a week to stay technically credible.

You repeat buzzwords in meetings to appear technically credible.

If you could still do something technical it certainly would be incredible.

5. You're meeting board members' objectives occasionally.

You're meeting board members' objectives regularly.

Your meeting with board members is canceled regularly.

6. The CEO is "rightsizing" and looks forward to your full support.

The CEO is "rightsizing" and looks forward to your full cooperation.

The CEO is "rightsizing" and looks forward to your empty desk.

7. You won't let users develop desktop applications.

You let users develop desktop applications but nothing over 16 bits unless accompanied by a parent.

You let users develop desktop applications as long as they practice safe specs.

8. You already have 4GL systems.

You are finishing a three-year conversion to 4GL systems.

You are still finishing a four-year conversion to 3GL systems.

9. You are not vendor-independent because you run proprietary software.

You are partially vendor-independent because you run open systems.

You are totally vendor-independent because vendors go around you and talk to the CFO.

Cohn is author of the humor book *Fear of Computers* and is trying to stay employed at a large company.

The virtual, visible corporation

Esther Dyson

What do many annual reports list as their company's greatest asset? People and partners, not computers or reusable code. In the new world of instant global communications a lot of things will change. Everyone knows about flatter organizations, virtual corporations, telecommuting and the like. But how does the new age play out in the *texture* of corporations as opposed to *structure*?

The short answer is that companies must become more visible. More of what any company sells will comprise information — whether it's plain data, news or analysis, technical support, consulting services, design services, interactive entertainment or competitive intelligence. All of those influence the nature of physical products. Some people will sell products; others in the chain will add value.

In a knowledge-based world, the quality of those relationships will matter more than the contractual conditions.

Of course, there will be contracts between supplier and customer, but in a knowledge-based world, the quality of those relationships will matter more than the contractual conditions — as in marriage.

Take the case of Microsoft in Europe, where the company sells (as it does in the U.S.) through a network of dealers, value-added resellers and consultancies that don't actually sell software products but guide customers' purchase decisions.

At a recent industry conference in Paris, Microsoft Europe President Bernard Vergnes spoke openly about changes in Microsoft Europe's structure and strategy. He admitted to a few mistakes and described the division's aims for the next year or two. He did all this plainly and straightforwardly, as if talking to an internal sales meeting — the informational, not motivational, part.

Most of the people in the audience were dealers, but not all had a particular relationship with Microsoft. But it didn't matter; by sharing information with them, Vergnes made them *feel* like partners. Even companies that have no contractual relationship with Microsoft are more likely to recommend its products if they feel they understand not just the products but Microsoft itself.

The best cement for a virtual corporation is a two-way flow of information — or visibility. Companies will find partners not just by offering discounts but by sharing information about themselves and sharing their wisdom.

Moreover, whether or not a company chooses to be visible, it will be. As a company, you can't hide. And the image you project, on your Web home page or elsewhere, should be true.

Visibility isn't just outsiders peering in; it's your employees out in the electronic world. They *are* the company. As the value of products diminishes, the outside world's interactions with your people will be what you sell. The quality of the interactions you foster will be what draws employees to your company.

Furthermore, partners will influence and feel involved in decisions their partners make even though companies will not necessarily allow outsiders into the formal decision-making process. By not being transparent but also allowing two-way interaction, such companies will in fact make better decisions.

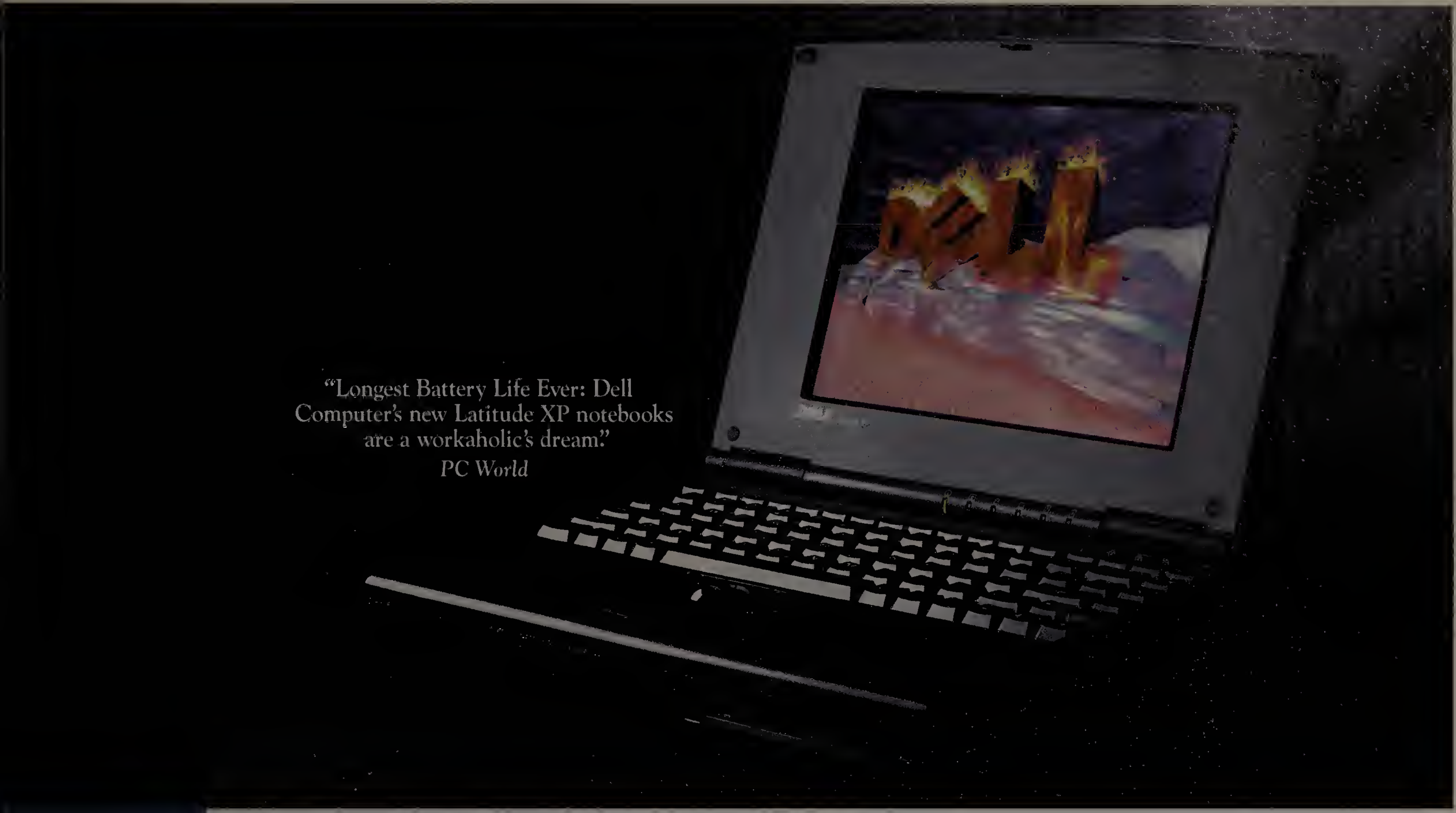
People want to buy information-based services and products from visible companies that operate as partners. They do not want commodity products from black boxes.

Dyson is president of EDventure Holdings, Inc. in New York. She welcomes readers' thoughts and can be reached at edyson@eff.org.

ANNOUNCING THE ONLY NONSTOP FROM CHICAGO TO LONDON.

---

*Prices valid in the U.S. only. Some products and promotions may not be available outside the U.S. Prices and specifications subject to change without notice. Quote from PC World, 10/94 issue, p. 64. *Latitude is powered by a NiMH battery, with the option of replacing the diskette drive with a second NiMH battery. The Intel Inside logo is a registered trademark and IntelSX, IntelDX2 and IntelDX4 are trademarks of Intel Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1995 Dell Computer Corporation. All rights reserved.


"Longest Battery Life Ever: Dell Computer's new Latitude XP notebooks are a workaholic's dream."
PC World

The big news at 35,000 feet these days is Dell Computer's line of Latitude™ notebooks and their extended battery life. But the bigger news is their prices have just been reduced, in some cases up to $700. So, now is the perfect time to check one of these workhorses-of-a-notebook on board.

You'll get a world of work done as you streak across the Atlantic. While those two-hour laptop guys around you are eventually left to eating peanuts and reading the safety instructions for the fifth time.

And for you power mongers out there, we even offer a 100MHz Dell® Latitude XP™ for just $4199. So call today to order these long-lasting Dell Latitude XP or Dell Latitude notebooks.

And let the people at your office check them onto their next transatlantic flight.

So then, when they finally touch down on that blessed plot, they'll have a notebook with plenty of juice left to do that expense report.

intel inside®

HOW DELL GIVES YOU EXTENDED BATTERY LIFE

The Dell Latitude XP notebook's lithium ion battery packs more juice into the same space as older batteries.

*The Dell Latitude notebook, our value-priced model, provides extended battery life by supporting 2 NiMH batteries.***

Our exclusive power management software is designed to dynamically adjust energy consumption.

Dell's engineering expertise combines advanced battery technology with power management software to give you higher performance without sacrificing battery life.

DELL®

DELL LATITUDE XP
IntelDX4™ 100MHz System
- 9.5" Active Matrix Color Display
- 8MB RAM/524MB Removable HDD
- 3 Year Warranty†

$4499
Product Code #600021
(Pictured System)

DELL LATITUDE XP
IntelDX2 50MHz System
- 9.5" Active Matrix Color Display
- 8MB RAM/340MB Removable HDD
- 3 Year Warranty†

$3599
Product Code #600016

DELL LATITUDE
IntelDX4 75MHz System
- 9.5" Dual Scan Color Display
- 4MB RAM/260MB Upgradeable HDD
- Second NiMH Battery — $99 more
- 1 Year Warranty†

$2299
Product Code #600035

DELL LATITUDE
IntelDX2™ 50MHz System
- 9.5" Dual Scan Color Display
- 4MB RAM/260MB Upgradeable HDD
- Second NiMH Battery — $99 more
- 1 Year Warranty

$1999
Product Code #600022

DELL LATITUDE
IntelSX™ 33MHz System
- 9.5" Dual Scan Color Display
- 4MB RAM/260MB Upgradeable HDD
- Second NiMH Battery — $99 more
- 1 Year Warranty

$1799
Product Code #600009

(800) 288-1100 MONDAY-FRIDAY 7AM-9PM CT • SATURDAY 10AM-6PM CT • SUNDAY 12PM-5PM CT
KEYCODE #12017 • CANADA* CALL 800-387-5755 • MEXICO CITY* CALL 800-228-7811

INTRODUCING VISUALWORKS 2.0. BECAUSE FATHER TIME IS BREATHING DOWN YOUR NECK.

Whether the challenge is development, deployment or system maintenance, it seems time is never your friend. Which is precisely why we created VisualWorks® 2.0. It's the object-oriented client and server tool for professional developers who are serious about saving time.

GOOD IN THE FIRST FIVE MINUTES.

At its heart, VisualWorks 2.0 is built around the premise that simple tasks should be simple. With point-and-click ease, you'll build basic database applications without writing any SQL or Smalltalk code. Our unique ObjectLens™ feature automatically converts relational data to business objects and back again. And, applications are instantly portable to Windows (including Windows NT), Macintosh, UNIX, and OS/2.

GOOD FOR THE NEXT FIVE YEARS.

Object-oriented to its core, VisualWorks 2.0 makes even the most difficult development possible. Written in ANSI standard ParcPlace Smalltalk™, you can use its extensive class libraries to build scaleable, compiled applications that incorporate distributed application logic for both client and server development. And true object-orientation means time saved through component reuse, reduced maintenance and extensibility.

FROM THE PEOPLE WHO WROTE THE OOP BOOK.

In short, VisualWorks 2.0 reflects the best thinking by the best minds in object-oriented programming. After all, as part of Xerox's famous Palo Alto Research Center, we developed Smalltalk. And we've worked with the Information Technology experts at major corporations to develop this release.

THE "MUST HAVE" TOOL FOR CLIENT & SERVER DEVELOPMENT.

Call today for a free VisualWorks 2.0 Solution Pack. Ask about our superior technical support, training, consulting and on-site mentoring services. You'll find this tool, backed by the ParcPlace team, the best way to get Father Time off your back.

VisualWorks 2.0

1-800-759-7272 ext. 400

All trademarks and registered trademarks are property of their respective owners. Outside the U.S. call 408-481-9090.

Medical company goes distributed, 42
Acer offers new server products, software, 44

Mt. Everest climbers take technical route

Notebook computers will track progress

By Michael Fitzgerald

Why surf the Internet from the summit of Mt. Everest? Because you can, of course.

Cruising the Internet from the ultimate height will not happen immediately, but it is one part of a dream for Steve Reneker, a 13-year information systems veteran who will act as de facto chief information officer on the '95 American Mt. Everest expedition that kicks off March 1.

ALAN LEVENSON

IS veteran Steve Reneker *hopes to bring technology to the top of Mt. Everest*

Because organizers already planned to bring computer equipment for research purposes, electronic mail from Everest seemed eminently achievable.

Reneker's path to Mt. Everest has been a long one, starting when he took up mountaineering in 1983. In the years since, he has scaled Mt. Whitney, the highest point in the continental U.S., and Mt. McKinley, the highest point in North America ("20,320 feet high," Reneker says without skipping a beat).

Last but not least

The expedition will be led by Paul Pfau, a deputy district attorney for the city of Los Angeles who has climbed the tallest mountain on six of the world's seven continents. On his first crack at climbing the seventh — Everest — Pfau contracted severe pneumonia.

This time, Pfau plans to retrace the path of George Mallory, the first Westerner to attempt Everest. Mallory, who disappeared near the summit in the 1924, followed a route along the mountain's North Ridge, a more challenging route than the one climbers typically follow today.

The 20-member team, which will include one of Mallory's grandsons, will use global positioning equipment from Trimble Navigation Systems, Inc. to plot an exact route. Using a handheld device called a Geo-Explorer attached to a Dell Computer Corp. Latitude XP notebook, the group will plot its position against recent topographical research overlaid

Mt. Everest, *page 44*

He's got high hopes

Steve Reneker

Resume: Joined Security Pacific Bank in 1982; helped start its first PC laboratory and helped manage the installation of human resources systems. Also helped manage human resources systems at Citicorp on the West Coast. Worked in IS for the city of Los Angeles, installing systems for then-Mayor Tom Bradley. Currently director of IS at the Eastern Municipal Water District in San Jacinto, Calif.

Latest achievement: In July 1994, with two partners, climbed California's Mt. Whitney, Mt. Muir and Mt. Russell, all more than 14,000 feet in elevation, in 16 hours, breaking the speed record by more than four hours.

Current goal: To climb Mt. Everest.

Pentium processors

Intel shifts into Overdrive

By Jaikumar Vijayan

Intel Corp.'s efforts to move the market to Pentium slipped into overdrive recently when the company finally announced its long-awaited P24T Pentium upgrade processor. But response to the chip is muted.

As the latest addition to Intel's Overdrive family of upgrade processors, the chip is expected to provide users of I486-based systems with a bridge to Pentium performance at a price point that Intel hopes will be low enough to evoke interest.

Pentium Overdrive

Processor features

- Superscalar architecture
- 32K Level 1 cache
- 32-bit bus interface
- On-package voltage regulator
- On-package fan/heat sink

The chip will sell for a suggested list price of $449 and speed up I486 SX2, DX2 and 25-MHz 486-based systems to 63-MHz, Pentium performance — or roughly 2½ times the current speeds of these processors. An 83-MHz version of the chip that will upgrade the 66-MHz DX2 and 33-MHz 486 processor will be available by midyear, Intel said.

At the same time, the Santa Clara, Calif.-based company also rolled back prices on existing DX2 and DX4 Overdrive processors by as much as 45%.

That kind of bait may be necessary to lure customers to upgrade, analysts said. The announcements come at a time when Pentium and 486 processor prices have been falling rapidly, which could dampen interest in upgrading.

"A year from now, users can get twice the performance they are getting today for the same amount of money," said Jennifer Munson, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H., suggesting that as prices continue to fall, users may be tempted to buy new systems instead of recycling older ones.

Where the upgrades are

At the moment, the biggest upgrade market lies in the vast installed base of 486-based systems, said Martin Reynolds, an analyst at Dataquest, Inc. in San Jose, Calif.

"In the last three years, around 70 million or so 486 systems have been sold. Of that, half would probably benefit substantially" from the sort of upgrading that the Overdrive processor offers, Reynolds estimated.

Typically, the systems that would get the most significant performance boost from an

Overdrive, *page 44*

AST steadies notebook offerings

By Michael Fitzgerald

■ After a lackluster 1994, AST Research, Inc. is starting 1995 with an effort that may signal the end of its up-and-down performance in the notebook market.

The Irvine, Calif., company recently introduced the Ascentia 810N, a value-class corporate notebook that should give AST a temporary technology lead in the market. Corporations use value-class notebooks when they do not need or cannot afford a cutting-edge laptop but still want a full-feature notebook.

The 5.9-pound Ascentia 810N has a 10.4-in., passive-matrix color screen, a 66-MHz Cyrix Corp. DX2 486 chip and a second battery option. Its base price is $2,499.

According to figures from International Data Corp. (IDC), AST remained fifth in unit share of the U.S. notebook market in 1994, behind Toshiba America Information Systems, Inc., Compaq Computer Corp., IBM PC Co. and Apple Computer, Inc. But the company has lost market share and faces pressure from competitors such as NEC Technologies, Inc. and Texas Instruments, Inc.

A good start

"AST had an off year in portables last year, and they needed to come out with guns blazing this year. This is a good start," said Bruce Stephen, an analyst at IDC in Framingham, Mass. AST needs to build on this start and attack the competition, he said.

AST officials said they have a window to establish themselves in the value-class market. According to Steven Andler, AST's director of portables marketing, the company has picked a larger screen and a faster (and cheaper than Intel Corp.) chip so it can at least get a short leg up on the competition.

"We're trying to give everybody a new definition of value," Andler said. "Our product is priced below some people's [50-MHz] DX2 systems, and we have a 10.4-in. display where everybody else has a 9½-in. display."

But Stephen and other industry analysts said they expect to see a series of pitched fights in the value end of the corporate notebook market this year.

A number of feature sets now found in high-end notebooks should move into the lower-priced middle range of the market, they said.

All in a name

Dell Computer Corp., which buys its Latitude notebooks from AST and resells them under the Dell name, is not making life easier for AST. Dell recently cut prices on its Latitude line by 7% to 13%, pairing a 50-MHz DX2 Latitude 450C and a 9½-in., passive-matrix screen at $1,999.

Commentary

Carole Patton

DOS under the covers

Windows has long been trying to live down its dependence on DOS. After all, the need to run atop DOS is what made Windows an environment and not an operating system. (It also made Windows the butt of unrelenting IBM jokes: It's a thing on a thing!) So with Windows 95, Microsoft has finally gotten rid of DOS once and for all, right?

Wrong. In his new book *Unauthorized Windows 95*, Andrew Schulman devotes some 600 pages to demonstrating that DOS is everywhere in Windows 95. For example, thanks to Intel's quirky chip design, all Intel processors need a small piece of real-mode DOS code at start-up to push them into protected mode. No, you won't see it, and no, you don't have to type "WIN" at the DOS prompt. In fact, you won't see a DOS prompt during start-up at all. But DOS is in there.

Essentially, Microsoft has taken some MS-DOS code, modified it to run WIN, HIMEM and IFSHLP and renamed it IO.SYS. (A rose by any other name?) And Schulman shows that DOS hangs around long after boot time. It's there when Windows 95 is up and running in 32-bit mode — with no DOS applications or 16-bit Windows applications running and without anyone installing a single real-mode DOS driver. Here, Windows 95 relies on DOS for many nonfile operations such as getting the date and time and setting the current directory. Schulman covers this in the first 17 pages of his book, including several methods you can use to spot DOS under the covers yourself, so I won't repeat them here.

So what's the concern about a little veteran DOS code? Windows 95 is a transitional system, and everybody knows it. But before you start touting the wonders of 32-bit protected mode, think about this: Windows 95 allocates the lower 1M byte of conventional memory (normally given over to DOS) exactly like earlier versions of Windows do. That's where device drivers (especially multimedia drivers) and virtual drivers (VXD) are installed, and these consume a lot of memory.

Microsoft has never done a good job of fixing Windows memory problems. Consider, for example, the Remote Access Server in Windows for Workgroups 3.11. It cycles its modem every few minutes, each time using up just a little more conventional memory. After about 30 hours, Remote Access Server gyrations have consumed so much low memory that Windows 3.11 can't start up some jobs. Microsoft's work-around: Tell users to periodically exit the server and restart it.

Every Windows program, Dynamic Link Library or driver allocates conventional DOS memory to start up a Windows application, even a 32-bit one.

Low memory is a crucial system resource. Show me a Windows 3.11 system with a sound card and Symantec's PC Tools for Windows 2.0 installed trying to run Symantec's CP Backup or Delrina's WinFax Pro 4.0, and I'll show you an out-of-memory error. The device drivers you see listed in the Windows 3.11 Control Panel are normally loaded into low memory — the DOS address area — and Windows 95 operates exactly the same way.

Counting the advantage

Right now, many corporations claim they won't purchase 16-bit Windows programs after mid-1996. They've decided (rightly) that Windows 95 won't run these 16-bit programs better than Windows 3.11. So long as 16-bit and 32-bit programs share the same conventional memory pool in Windows 95, this situation won't change significantly.

The advantage Windows 95 actually provides 32-bit applications is a separate context — basically page tables for managing memory. Your 32-bit Windows programs do not get their own virtual machine — an exclusive address space. Windows 95 runs them in the same Virtual Machine No. 1 as the 16-bit ones. It doesn't take much speculation to envision a program-loading sequence that will cause out-of-memory errors even when there are plenty of other system resources available.

Just remember that the VXDs in your multimedia device drivers don't use memory above 1M byte except for code, and data buffers and buffers for the hardware also remain in conventional (low) memory.

Patton is chief analyst at Mendham Technology Group in Mendham, N.J., and publisher of "Windows Letter," a newsletter for corporate decision-makers. Her book, *OS/2 Goldmine*, will be available from Van Nostrand Reinhold in March. Contact her at MCI Mail 401-4869 or CompuServe 73700,2503.

Medical company goes distributed

By Ed Scannell

In late 1991, the outlook for medical products distributor The Darby Group Co. was a bit grim.

Severe competition was driving down prices and shrinking profits in an already margin-thin business. The situation prompted Mike Ashkin, chief executive officer at the Westbury, N.Y., company, to launch a major technology renovation. His goal was to help the company deliver products and services faster and more efficiently as well as significantly reduce recurring costs.

One of those recurring costs was the company's aging network of host-based systems.

"It was always a chicken or egg thing in terms of either downsizing employees or downsizing the IS operation," Ashkin said. "We were sort of betting the company on this move."

That bet has paid off handsomely. In less than three years, Ashkin and his team have weaned Darby Group off a mishmash of host-based systems and software. The company now has a single host-based platform that anchors a more standardized distributed platform that is better able to accommodate emerging technologies. One result has been a streamlining of the information systems operation.

ON SITE

The Darby Group Co.

Westbury, N.Y.

Challenge: To downsize mission-critical applications from proprietary host-based systems to distributed LAN-based systems.

Strategy: Build distributed strategy around Microsoft's Windows NT and SQL Server.

Results: Downsized IS department by roughly 30% and dramatically reduced returns processing backlog from a few weeks to a few days.

The PC difference

In late 1991, Darby's IS operating environment consisted of IBM 3090s, 4381s, 9370s and AS/400s running multiple operating systems; Digital Equipment Corp. minicomputers; a distributed network of AT&T Corp. servers; and Paradyne, Inc.'s Data 100 network links connecting the company's dozen or so remote sites. There was not a LAN in the house, and the handful of PCs sat unconnected.

But during the last couple of years, all that has been sliced down to a single IBM 3090 running MVS. The company now has Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare 3.x running on relatively low-cost Intel Corp.-based servers connecting well over 1,000 PCs. The company has cut its IS expenses approximately 35% during the last three years and reduced annual IS labor costs by $250,000.

"PCs have given my company a chance to have a bottom line. If not for those systems, we would not be profitable," Ashkin said.

The quilt work of host-based hardware and software grew over the years partly because of Darby's policy of sticking with an acquired company's IS system. Supporting this variety of complex hardware and software became impractical, however, and in some cases caused the company to lose business.

For example, Darby could not process an order from one of its remote sites if the mainframe in Westbury was down. Remote sites did not have a local database containing a subset of the central database that would allow them to continue conducting business.

So in late 1991, Ashkin and his IS team took a hard look at the operation and decided they needed a standard distributed platform that could better accommodate emerging technologies, such as graphical environments and relational databases — which they believed would better empower users.

"We found it easier to buy new distributed equipment than to force-fit the older stuff we inherited," Ashkin said.

More than a toy

What perhaps propelled Ashkin's aggressive vision of a distributed computing strategy was when his son Carl, now Darby's chief information officer, planted a PC on his father's desk just a few years ago.

"I think he thought it was going to be a toy. But when he found out he could put a report on a laptop and distribute it to others — and not have to wait weeks for IS to help him — he got interested," Carl Ashkin said. "It never hurts you to have the CEO of the company really into the technology."

Through this distributed systems approach, Darby moved its order-entry application from its IBM System 370 architecture machines to LAN-based systems. Within 18 months of making that decision, the firm had replaced almost all of its terminals with PCs and built a wide-area network that connected all remote offices to the mainframe at headquarters.

This client/server approach has also allowed Darby to improve the efficiencies of the "returns" aspect of its generic drug business. Returns in the pharmaceuticals market are more complicated than in other businesses because of strict government regulations.

Before the company proceeded with its distributed strategy, it was typically a few weeks behind in processing returns. But since the company rolled its IBM 4381 out the door and rolled in a server system running Windows NT and SQL Server, those backlogs have been cut down to a day or two.

While Darby has aggressively moved forward with its distributed strategy, including putting LAN administrators in some of its remote sites, company officials do not see true decentralization of IS operations coming any time soon. In fact, they prefer to keep a tight grip on certain core IS functions, including application software development.

"We used to have 100 people in IS, and now we have 70," said Neal Perlman, Darby's IS director. "We could accept a 30% reduction by eliminating anything that was redundant in the home office with remote sites. It is why you need to keep certain things centralized, even as you distribute other functions out."

Exceptional Trade-In Offer

Check with your local reseller for details.

Not only was Ted amazed at the low cost of the Digital terminals, he was even more impressed with their performance.

When it comes to great performance in a Digital terminal, nothing should surprise you. While the VT and Dorio text terminals may not be capable of circus tricks, they can certainly perform some incredible feats when it's time to get down to work. You can choose single-session, multi-session, and color models for any computing environment. Backed by a three-year warranty and world-wide service support, this complete family of terminals has the lowest cost of ownership and is as easy to set up as it is to use. So when considering a text terminal, take a good look at the Digital family. Call 1-800-777-4343 for more information or call the reseller nearest you. You'll be amazed at what this family can do.

VT and Dorio. Out of the ordinary.

digital

©Digital Equipment Corporation, 1994. Digital, the Digital logo, VT and Dorio are trademarks of Digital Equipment Corporation.

LAN servers

Acer releases new server products, bundled software

By Jaikumar Vijayan

Acer America Corp., rated as one of the fastest-growing companies in the PC business, last week announced two server products and bundled network and server management software in the hopes of getting more recognition in the LAN server market.

Acer, which last year became a Top 10 vendor in the desktop business, grew more than 85% in 1994.

The entry-level AcerAltos 800/P, based on Intel Corp.'s 90-MHz Pentium processor, was primarily designed as a file-and-print server that supports up to 32 users, according to the San Jose, Calif., company. The starting price for a base system is $3,118.

The midrange, dual-processor AcerAltos 7000/P, which is being positioned as a database/application server, supports two 90-MHz Pentium processors, up to 64 users and has a starting price of $5,187.

"Price/performance was a big factor in our decision to choose Acer," said Ken Bryant, information systems manager at General Health Practice Management, Inc. in Baton Rouge, La.

The organization has tested the remote capabilities of Acer's new Server Manager software across 21 remote Acer sites, "and as far as the quality of Acer products are concerned, there are no complaints so far," Bryant said.

Bundled up

Acer said it will bundle its server and network management software with its server products. The new monitoring software, which has a graphical user interface, among other things, provides network administrators with fault detection and automated early warning signals in the event of a system or network problem, Acer said.

Acer, which last year became a Top 10 vendor in the desktop business, grew more than 85% in 1994, according to International Data Corp. in Framingham, Mass.

FREE

MOBILE COMMUNICATIONS SEMINAR

Learn the latest information on automating communications with your mobile computers in the field. XcelleNet® and Toshiba introduce the perfect way to improve your mobile communications processes using RemoteWare®. Free seminars are being held in 28 cities, and we'll be in your area soon. The topic is hot, and the information is free. So reserve your seat today.

Call 1-800-322-3366

XcelleNet®

In Touch with Tomorrow
TOSHIBA

Overdrive

CONTINUED FROM PAGE 41

upgrade processor would be the more recent 486-based systems with features such as a local bus, larger disk drives, Peripheral Component Interconnect slots and recent BIOS versions, analysts said.

Even in such cases, greater overall system performance can be achieved only through a processor and motherboard upgrade, said John Williams, MIS manager at Priority Pharmacy in San Diego. Processor upgrades alone seldom boost system performance substantially, he said.

Logical decision

With new systems not quite lasting a year before requiring upgrades, "it's always made more sense for us to replace the whole motherboard" when doing a systems upgrade instead of tinkering with jumper settings and switches on old motherboards, Williams said.

Williams, who said he has run into compatibility problems when attempting just a processor upgrade, said buying a new motherboard not only eliminates most system incompatibilities but is also pretty economical these days. "You can go out and get a real nice motherboard for less than $200," he said.

Despite the low prices, when it comes to older 286- and 386-based systems, Priority buys new systems instead of upgrading, Williams said.

Upgrade priorities

Another manager echoed that sentiment. "Right now, we have the option of upgrading our 486 systems, but all of our old 386 systems are going to be replaced," said Ken Bryant, information systems manager at General Health Practice Management, Inc. in Baton Rouge, La.

"Ease of installation and price are right on top of the list" when considering processor upgrades, Bryant said.

Intel's new Overdrive processors, which started shipping last week, will upgrade most 486-based systems with either a 237- or 238-pin socket, the company said. According to Intel, the user can replace the chip.

Falling prices

Intel last week rolled back prices by up to 45% on some Overdrive processors. A 100-MHz DX4 Overdrive processor that used to cost $649 now sells for $349. Similarly, a 75-MHz version, which cost $549, now goes for $299.

Mt. Everest

CONTINUED FROM PAGE 41

on a scanned orthographic photo.

The team also hopes to use the global positioning equipment to help verify Everest's elevation.

The group will use a second notebook to track equipment, keep medical records and do word processing.

But it is unlikely everest.net will happen on this trip. "We're missing a high-speed link," Reneker said.

Vendors have donated most of the group's equipment, On Technology Corp. is sponsoring its base camp and NEC Corp. has provided a satellite link and 300 minutes of free satellite time. The speed of the link, however, is 2.4K bit/sec., which is too slow for effective Internet communications. But the link can support fax communications at 9.6K bit/sec., so the team will send some faxes from its highest base camp.

New Products

Avid Technology, Inc. has announced MediaSuite Pro, a video editing system for Silicon Graphics, Inc.'s Indigo workstations.

According to the Tewksbury, Mass., firm, MediaSuite Pro lets users incorporate graphics such as real-time simulations, three-dimensional animations and structural models with video and audio.

Programs created with the product can be recorded, edited and played at full size and full motion and recorded directly from the computer to videotape. Programmable video effects include dissolves, wipes, motion control, chroma key, transitions and picture-in-picture.

MediaSuite Pro costs $14,995.

▶ *Avid Technology*
(508) 640-6789

Summagraphics Corp. has introduced SummaColor Pro Series Models 1311 and 1317, desktop color printers.

According to the Austin, Texas, firm, the SummaColor Pro Series Models 1311 and 1317 are small-format digital printers that incorporate ink-dot-size control and thermal transfer technologies.

The printers are targeted at graphic artists and feature an optional Ethernet adapter, font support for 39 Type 1 Adobe Systems, Inc. fonts, a SCSI hard drive interface and 12M bytes of standard memory, upgradable to 136M bytes.

The letter/legal-size Model 1311 costs $6,495, and the tabloid-size Model 1317 costs $8,995.

▶ *Summagraphics*
(512) 835-0900

Product short

MetaWare, Inc. has announced the High C/C++ compiler with a software workaround for the Intel Corp. Pentium floating-point division error, and **Cygnus Support** has announced a similar patch for the GNU compiler-GCC. Both are free to users of the respective products. MetaWare, Santa Cruz, Calif. (408) 429-6382. Cygnus Support, Somerville, Mass. (617) 629-3000.

The Toshiba T4700CT

A notebook so powerful, it breaks the sound barrier.

The Toshiba T4700CT can run your most intense applications or even help you run a presentation. With its SL Enhanced i486™DX2 50MHz processor, it easily handles graphics-rich programs. The built-in multimedia capabilities let you create and give breakthrough presentations anywhere, all on Toshiba's stunning color active matrix screen. With so much going for it, buying a T4700CT notebook is a very sound decision.

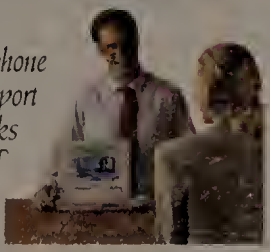
For a Toshiba dealer near you, call 1-800-457-7777.

Incredible Sound: *An integrated sound system and built-in speaker let you enjoy fantastic sound whenever you want.*

The only computer you'll ever need: *The optional Desk Station IV, lets you instantly connect to your network, printer, VGA monitor, mouse, and full-size keyboard.*

Two separate PCMCIA slots: *A 16mm and a 5mm slot are your keys to expansion, —for modems, storage and more.*

A multimedia roadshow: *Headphone or external speaker port and microphone jacks make the T4700CT perfect for presentations.*



T4700CT FEATURES:
- 50MHz SL Enhanced i486™DX2
- 9.5" dia. color TFT-LCD active matrix display
- 256 simultaneous SVGA colors at 640x480 resolution
- 320/200MB HDD
- 8MB RAM expandable to 24MB
- Two PCMCIA slots (16mm and 5mm)
- VL local-bus video
- Integrated graphics accelerator
- Built-in microphone
- .WAV Audio capabilities
- Audio jacks: headphone/speaker, microphone
- NiMH battery for extended life
- QuickCharge battery recharge system
- 3.5" 1.44MB floppy disk drive
- BallPoint™ mouse with QuickPort™
- MaxTime™ Power Management system
- LCD status icon bar
- DOS™, Windows™, and Windows Sound System™ software pre-installed
- Toshiba Technical Support line: 7 days a week, 24 hours aday

In Touch with Tomorrow

TOSHIBA

© 1994 Toshiba America Information Systems, Inc. The Intel Inside logo is a trademark of Intel Corporation. All products indicated by trademark symbols are trademarked and/or registered by their respective companies.

STOCK MARKET TRANSACTION · STO

MAYER & SCHWEITZER, INC. DHL CREDIT AGRICOLE DE LA MANCHE PIZZA HUT BANCO NACIONAL

THANKS TO A BUSINESS CRITICAL SERVER, ONE OF THE LARGEST FAST FOOD FRANCHISES KNOWS INSTANTLY WHAT PROMOTIONS WILL BE POPULAR THAT DAY. HOW MUCH FOOD TO COOK. WHAT ITEMS NEED TO BE ORDERED. THEY MAINTAIN, UPGRADE AND ACCESS ALL THEIR SYSTEMS REMOTELY. KEEP THEIR PRICES DOWN. KILL THE COMPETITION. *COULD THEY BE HAVING YOU FOR LUNCH?*

IF YOU'RE IN THE FAST FOOD BUSINESS, YOU KNOW THERE'S A LOT OF COMPETITION FOR THE FOOD SERVICE DOLLAR. THAT'S WHY SCO BUILT ONE OF THE FIRST AFFORDABLE BUSINESS CRITICAL SERVERS DESIGNED TO SUPPORT THE MILLIONS OF TRANSACTION-BASED FUNCTIONS CRITICAL TO YOUR BUSINESS. THOUSANDS OF OUR CUSTOMERS HAVE PROVEN OUR SERVER SOFTWARE IS RELIABLE, REPLICATED QUICKLY AND EASILY SITE TO SITE, AND WORKS ON THE PLATFORMS YOU HAVE, TODAY. FIND OUT MORE ABOUT SCO BUSINESS CRITICAL SERVER SOFTWARE, CALL 800-726-5738.

SCO®

IT'S BUSINESS CRITICAL. IT'S SCO.

[illegible] AUTOMOTIVE PHARMACEUTICAL INSURANCE SUPERMARKETS FAST FOOD CONSTRUCTION

SCO, The Santa Cruz Operation and the SCO logo are registered trademarks of The Santa Cruz Operation, Inc. in the USA and other countries. ©1994 The Santa Cruz Operation, Inc. All rights reserved.

LANs
Servers
Software for groups

Workgroup Computing

SGI downsizes
its Onyx Reality
machine, 49

Texas Commerce reinvents itself

Workflow is critical to bank's new 401K system

By Mary Brandel

Texas Commerce Bank NA had a busy 1994. At the beginning of the year, all 9,000 employees at the Houston-based subsidiary of Chemical Banking Corp. embarked on a top-to-bottom re-engineering project, uncovering 15,000 recommendations for process changes.

"We looked at all our processes. Even if we were filling out a form in triplicate, we'd question why."
— Glenn Rust, vice president of management consulting

In the midst of that project, the bank rolled out a new 401K business after acquiring Ameritrust, a trust company.

"We just got the salespeople" from Ameritrust, said Anita Ward, senior vice president at the bank. "So we needed a product, operations and a system in the very near term so that we didn't lose market share to companies with an existing infrastructure."

In the spirit of re-engineering, Texas Commerce did not just create a mirror image of the Ameritrust business. "If we hadn't re-engineered the process, we would have created the same 401K product as others have," Ward said.

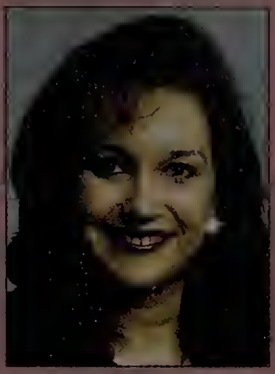
Instead, it created a 401K plan called Avesta. It has attracted 26,000 participants, with another 40,000 in the enrollment process.

After just six months, Avesta revenue is 1½ years ahead of schedule, and operating expenses are down 80% from Ameritrust's business, Ward said. And whereas Ameritrust's 401K staff numbered 100, Texas Commerce employs just 16.

At the core of the 401K system — as well as many of the 1,005 projects scheduled to be completed this year — is workflow technology.

Workflow is important to 401K plans because it can "bring together the investment plan with the individual's account," said Mark Hardie, a technology analyst at Tower Group, a bank technology consulting firm in Cambridge, Mass. Those systems tend to be separate, he said.

Hardie said the goal of integrating those systems is threefold: better management of increasingly diversified investment funds, close tracking of the impact on the employee's account and higher quality interaction between the bank employee and the customer.



"You don't gain the maximum impact of re-engineering when you . . . arbitrarily draw a boundary around a process. For us to truly redesign and become a different bank, we had to take the entire bank . . . through this exercise."
— Anita Ward, senior vice president

Problems with paper

As Ward described it, many 401K systems are manual and error-prone. Participants fill out at least six long forms and give them to their human resources department, where they are compared against personnel records.

Those paper copies are sent to the bank, where the data is entered into its system. For six weeks, however, the form is not processed because participants are allowed to make changes. Making changes involves another piece of paper, which means "you're in a data entry frenzy for six weeks," Ward said.

At the end of the enrollment period — and at every payroll cycle — the client company sorts out 401K participants from the payroll, and the bank matches those records with its own.

"You're always reconciling paper to the payroll tape," Ward said. "And you end up with errors because maybe I just recently enrolled, but the payroll cycle ended two days ago."

Texas Commerce's new system precludes these problems. The client provides the bank with an electronic payroll record for all employees. "All the data we'd need to set up a participant is resident on that record," Ward said.

To enroll, participants fill out an electronic form on a PC at the client site. The PC runs ViewStar Corp.'s workflow software as well as some Windows appli-

Texas Commerce, *page 49*

Notes packages unite voice mail with E-mail

By Suruchi Mohan

LAN-based electronic mail was once considered quite a novelty. But as E-mail becomes more entrenched in organizations, users seem to be taking it for granted and looking for more functionality on their desktop. Or maybe vendors think users should want more than just E-mail in a package.

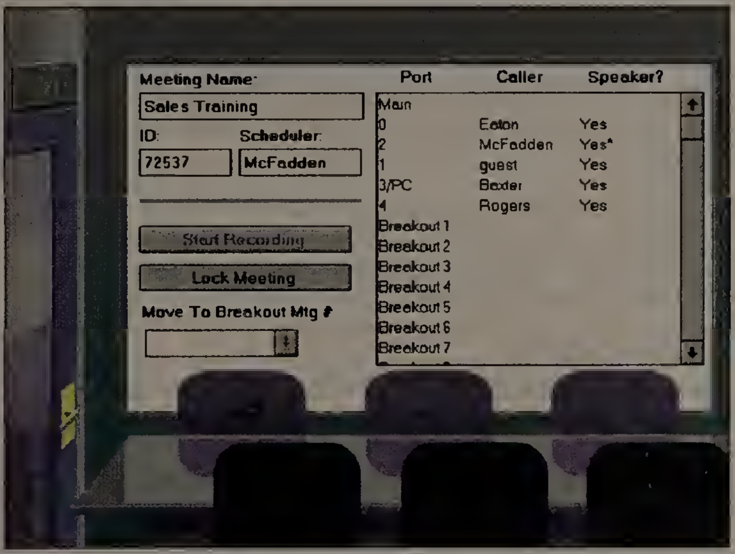
Acting on the premise that users need their faxes, voice mail and E-mail to arrive in the same mailbox, vendors are combining these diverse technologies.

At the Lotusphere conference in Orlando, Fla., last week, Big Sky Technologies in San Diego announced its Remark MessageCenter for Notes, a product that essentially integrates voice mail with E-mail.

An old idea takes flight

The concept of MessageCenter is not new to Big Sky. In the summer of 1993, the company, then known as Simpact Associates, introduced its PhoneClient development tools that third-party developers could use to write applications using Lotus Development Corp.'s Notes development platform. MessageCenter was written using PhoneClient. The latter sits on Phone Notes, which in turn runs on an OS/2-based server.

The company has essentially taken the development work out of developers' hands and left them with only the need to customize, said Dusty Sykes, a consultant at Vanguard Communications in Palo Alto, Calif. "Their developers were having to do so much; they refined [the product] and gave a bigger chunk of functionality with MessageCenter. Now, the end user is paying for customization, not for the development of the entire messaging capability."



Meeting Name: Sales Training
ID: 72537
Scheduler: McFadden

Port	Caller	Speaker?
Main		
0	Eaton	Yes
2	McFadden	Yes*
1	guest	Yes
3/PC	Baxter	Yes
4	Rogers	Yes
Breakout 1		
Breakout 2		
Breakout 3		
Breakout 4		
Breakout 5		
Breakout 6		
Breakout 7		

Latitude Communications' MeetingPlace *integrates audioconferencing with E-mail*

MessageCenter converts the Notes Mail database into a unified mailbox that is capable of handling fax, voice mail and E-mail messages. Its auto attendant feature lets calls be routed and allows paging. Users can dial in to the MessageCenter to read their E-mail and listen to their voice mail messages. Alternately, they can use the phone to dial into the database and have their E-mail read to them using text-to-speech conversion.

Although the company touts the product as a possible replacement for voice mail, large users said they will not do that any time soon because they do not think the product will be able to handle large volumes of calls. "We're happy to buy advanced telecommunications from a vendor," said a user at a New York-based insurance broker who asked not to be named. "We don't want to become our own voice-mail administrator." She did say it would be useful to be able to share directories: "This is more important than listening to E-mail."

Audioconferencing made easy

Additionally, as audioconferencing takes off, vendors are trying to integrate these systems with E-mail. Earlier this month, Latitude Communications, Inc. in Santa Clara, Calif., announced MeetingPlace E-mail Gateway, which essentially integrates audioconferencing with E-mail.

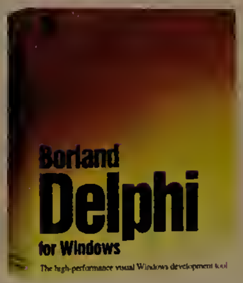
MeetingPlace is an audioconferencing server that lets users set up conferences without help from operators at telecommunications companies. Users schedule meetings, distribute materials or notify attendants with the E-mail transport. The audioconferencing server connects to a company's private branch exchange system, which goes into the public switched-telephone network. The E-mail gateway sits on the LAN and talks to the conferencing server via TCP/IP.

On the Lotus front, the company supports Vendor-Independent Messaging on the gateway, so CC:Mail and Notes users can directly access the network.

Feed it at SD‘95

Attend the Development Industry's Conference & Exhibition

SD ‘95 is an entire week focused exclusively on the needs of application development professionals. This premier event features 4 powerful conferences and the largest tools exhibition in the world. Join the core of the development industry at SD ‘95 and get up-to-date on new and improved developer tools, talk to the experts who have solutions for the issues you face, get your product questions answered directly by vendors' lead developers, and join your peers in ad hoc discussions on the show floor, in the classroom, and around the hallways of the Moscone Center in San Francisco.



Borland will give away 1000 copies of Delphi– Each Day of the Show!

Gupta will give away Gupta SQLWindows Solo - Stop by and see the Gupta Theatre demonstration.

FREE T-SHIRTS!

Free limited edition t-shirts to the first 1000 PRE-REGISTERED attendees – Each Day of the Show!

Free Technical Classes!

Learn about the tools available today – directly from the developers themselves:

Tuesday Morning, February 14

Microsoft

Learn the in-depth technical details about some of the hottest tools on the market. For up-to-date information on Microsoft's suite of training offered at SD, call the Microsoft fax-back line at **(206) 635-2222** and request document #850.

Wednesday Morning, February 15

Borland

Borland will have an in-depth technical briefing on Delphi, Borland's new high performance client/server application development tool.

Computer Associates:

Learn first-hand about CA Visual Objects, a feature-rich developer's workbench with a powerful object-oriented programming language and extensive database connectivity capabilities.

Intersolv

Join Intersolv to learn how to uncover threats to your quality and schedules, automate team communications, cut development and test time, and meet quality standards.

SunSoft

SunSoft's C++ experts will discuss the language, the industry, and how vendors will respond to growing user demands as the language evolves.

SCO

SCO will show you how to get past the “Motif barrier” with SCO Visual Tel, a full-featured, extensible, scripting language for building Motif desktop tools and applications.

Silicon Graphics

Andrew Palay, Principle Scientist at SGI, will discuss how Silicon Graphics Developer Magic environment supports rapid development of C++ applications with high-level builder components and new fix-and-continue functionality.

Free Roundtables!

Join your peers at informal, thought-provoking “Birds-of-a-Feather” sessions, including:

Tuesday, February 14, 8-9:45am
Emergence of OLE Controls

Thursday, February 16, 1-3pm
Comparing Component Software Strategies

Friday, February 17, 11:30am-12:30pm
Bring Your Tough C++ Questions

The Exhibition Hall

Over 200 vendors have already signed up for the largest and most prestigious development tool exhibition in the world.
Key vendors include:

Microsoft
Computer Associates
Object Design
Gupta
Symantec
SunSoft
AT&T
Visix

Borland
Intersolv
Apple
Watcom
Neuron Data
Progress
Intel
Cadre

Motorola
Powersoft
IBM
MicroFocus
Novell
Sterling
Silicon Graphics
Legent

SCO and over 200 more of the hottest vendors!

Serious Fun!

Tuesday, February 14
Borland Announcement and Party, 7:00pm

Wednesday, February 15
Symantec Announcement and Party, 7:00pm

Thursday, February 16
Powersoft/Watcom Announcement and Party, 5:30pm

SD ‘95 EXHIBITION FEBRUARY 14-16

SOFTWARE DEVELOPMENT

Software Development '95
February 13-17
Moscone Center
San Francisco, CA

To Register for the Show:
Call (214) 245-8874.
For more Conference Information:
Fax the completed form to (415) 905-2222.

*Name*________________________
*Title*________________________
*Company*______________________
*Address*______________________
*City*______________*State*______
*Zip*__________*Phone*__________
*Fax*__________*Email*__________

CW

Sync Research offers SNMP-based apps

By Laura DiDio

■ Sync Research, Inc. in Irvine, Calif., recently introduced new Unix and Simple Network Management Protocol (SNMP)-based applications for its FrameNode remote-access products and its ConversionNode protocol converter devices.

The FrameNode remote-access devices transmit merged IBM SNA and LAN traffic and provide users with RFC1490-compatible access to wide-area networks over frame relay. The ConversionNode products act as protocol converters, merging LAN and SNA traffic on the same network.

The network management applications, dubbed Sync/Manager and Sync/Monitor, run on Unix and SNMP platforms. They let network administrators manage and monitor mixed SNA and LAN traffic while retaining the familiar look and feel of IBM's NetView SNA network management, said Sync President John Rademaker.

Sync/Manager and Sync/Monitor for SNMP work in conjunction with various network management platforms to provide customers with an integrated, SNMP-based network management system for FrameNode and ConversionNode networks.

Sync/Manager for SNMP provides businesses with configuration, monitoring and individual log-on capabilities for Sync Research devices using Hewlett-Packard Co.'s HP OpenView for Windows and HP OpenView for Unix. The Sync/Monitor package gives network administrators a graphical picture of the network and delivers a "world view" of the enterprise using Unix management platforms, such as NetView for AIX, HP OpenView for Unix and Sun Microsystems, Inc.'s SunNet Manager, Rademaker said.

Both Sync/Manager and Sync/Monitor for SNMP are available now and are priced at $2,995 each. Sync/Manager for HP OpenView for Windows is shipping now and costs $995.

[illegible]

Locus Computing Corp. has announced Locus/FTP Internet host file transfer, TinyTerm Unix terminal emulation and the Eudora local, enterprise and Internet eletronic-mail interface.

According to the Inglewood, Calif., company, the products are options to Locus' PC Interface 5.0 PC-to-Unix connectivity software. Locus/FTP connects any TCP/IP host on the network or Internet and lets users drag and drop files from the remote host to the local drive or between remote hosts.

The Eudora E-mail interface is a graphical Windows interface to Unix E-mail servers.

Locus/FTP costs $79, TinyTerm costs $89, and the Eudora E-mail interface costs $59.

▶ *Locus Computing*
(310) 670-6500

Belkin Components has announced OmniView, a keyboard-controlled switch that lets users control up to six PCs from a single keyboard.

According to the Compton, Calif., company, OmniView sends correct signals to the keyboard and mouse port so each PC acts as if it were directly connected. Users can select which PC to control.

The product requires no software installation and can be cascaded to control up to 216 PCs. A scan mode shows the status of each PC at selected intervals, the company said.

OmniView costs $349.

▶ *Belkin Components*
(310) 898-1100

Northpoint Software has announced CompassPoint, a visual database for Windows.

According to the Berkley, Mich., company, CompassPoint holds up to 100,000 scanned images including photos, slides, illustrations and computer-produced image files.

Stored with each image are up to 15 searchable fields, a keyword field and two description fields. The product uses data compression to store and send thumbnail images for browsing over a network to limit network clogging.

CompassPoint costs $995.

▶ *Northpoint Software*
(810) 543-1770

Product short

Walter Oney Software has introduced Boarding House Reach, groupware that lets users copy a Windows clipboard from any computer in a workgroup with one mouse click. Cost: $49. Walter Oney Software, Boston, (617) 227-5620.

Texas Commerce reinvents self

CONTINUED FROM PAGE 47

cations that provide advice and what-if modeling to help with investment decisions.

From the workstation, field data is transmitted directly to a work queue at Texas Commerce. The workflow system automatically matches up that information with the payroll record and then sends the form to be processed in a 401K accounting system. Unless the form is rejected, no human interaction takes place.

The bank also offers mail-in, fax-in and call-in enrollment via a voice-response unit. However, the fax option does require manual data entry "because there is no way to [read] optical character recognition data 100% accurately," said Glenn Rust, vice president of management consulting. But mail-in forms are bar-coded with the client's payroll information in advance, and when the form is scanned in, workflow is initiated.

Consolidation advantage

Key to the system, Hardie said, "is having a single point of input, and that individual doesn't have to be a senior person in human resources. HR responsibilities [are starting to move] into the lap of the bank."

Plus, "you don't have this chasm across which you toss a bunch of forms," he added.

But the technology did not come first at Texas Commerce; business did. "We had the teams design new workflows ... without knowledge of the technology," Ward said. "But oftentimes, it became apparent that the technology and workflow could assist the process."

Volatile industry

Observers may wonder why all this re-engineering had to happen at once. But, Ward explained, "the entire field of banking is undergoing tremendous change. Mutual fund companies can sneak up on us, as can others in the credit-card market. And at the same time, people are moving toward home banking."

To reinvent itself, "we had to take the entire bank through this exercise," Ward said.

SGI proves smaller units can be better

Downsized Reality machines give users high-end graphics desktops

By Jean S. Bozman

MOUNTAIN VIEW, CALIF.

Silicon Graphics, Inc. (SGI) recently downsized its high-end graphics Onyx Reality machine — the kind of computer that generated images for the movie *Jurassic Park* and designed submarines for the U.S. Navy.

Redesigned as a one-processor personal workstation for engineers and designers, the smaller unit is expected to reduce waiting lists that control access to bigger Onyx Reality machines at busy engineering sites.

The Reality Station costs $94,000, far less than the $170,000 entry price for the large-scale Reality machines, SGI said earlier this month.

Users at sites that already own large Onyx Reality graphics computers said the low-end version will probably shorten sign-up sheets for the bigger machines at large engineering shops. "When you buy an Onyx, you put it in a lab, and everybody can share it," explained Michael Zeitlin, a visualization technology manager at Texaco, Inc.'s Houston office. At Texaco, dozens of users share several large SGI machines to run seismic analysis and oil-reservoir simulation applications, he said.

A Reality Station would let some users have a high-end graphics desktop, freeing the bigger machines to run larger problems, Zeitlin said. Today, Texaco uses SGI's Indigo2 workstations — which cost up to $40,000 — to develop graphics applications that are later deployed on the large Onyx machines.

SGI's Reality Station

Processor: 200-MHz Mips Technologies, Inc. R4400 chip
Features: One R4400 CPU, 1M byte of secondary cache, 64M bytes of memory, a 2G-byte system disk and a 21-in. high-resolution color monitor
Available: March, with shipment of an audio/sound option slated for April
Base price: $94,900

Putting the parts together

At General Dynamics Corp.'s Electric Boat Division in Groton, Conn., employees use a half-dozen large Onyx machines to design submarines for the Navy. But smaller units could take on sections of a larger design. "The way you get the big models is by putting together little models," said Jim Boudreaux, engineering manager for computer systems technology at the facility. "It would be nice if you could work on the little pieces without working on the big machine." Boudreaux said he had not yet evaluated the Reality Station.

According to analysts, SGI is making an aggressive move to maintain its price/performance edge over rival workstation makers IBM, Hewlett-Packard Co. and Sun Microsystems, Inc. "What SGI is doing is using their leadership in graphics to move into the high-volume graphics market," said Dominic Ricchetti, manager of workstation research at Dataquest, Inc. in San Jose, Calif. Even so, he estimated that 15% or fewer of all workstation sales are for high-end three-dimensional graphics.

Howard Richmond, vice president of high-performance computing at Gartner Group, Inc. in Stamford, Conn., said SGI wants to boost demand for its wares. "The demand just expands as the price comes down," he said.

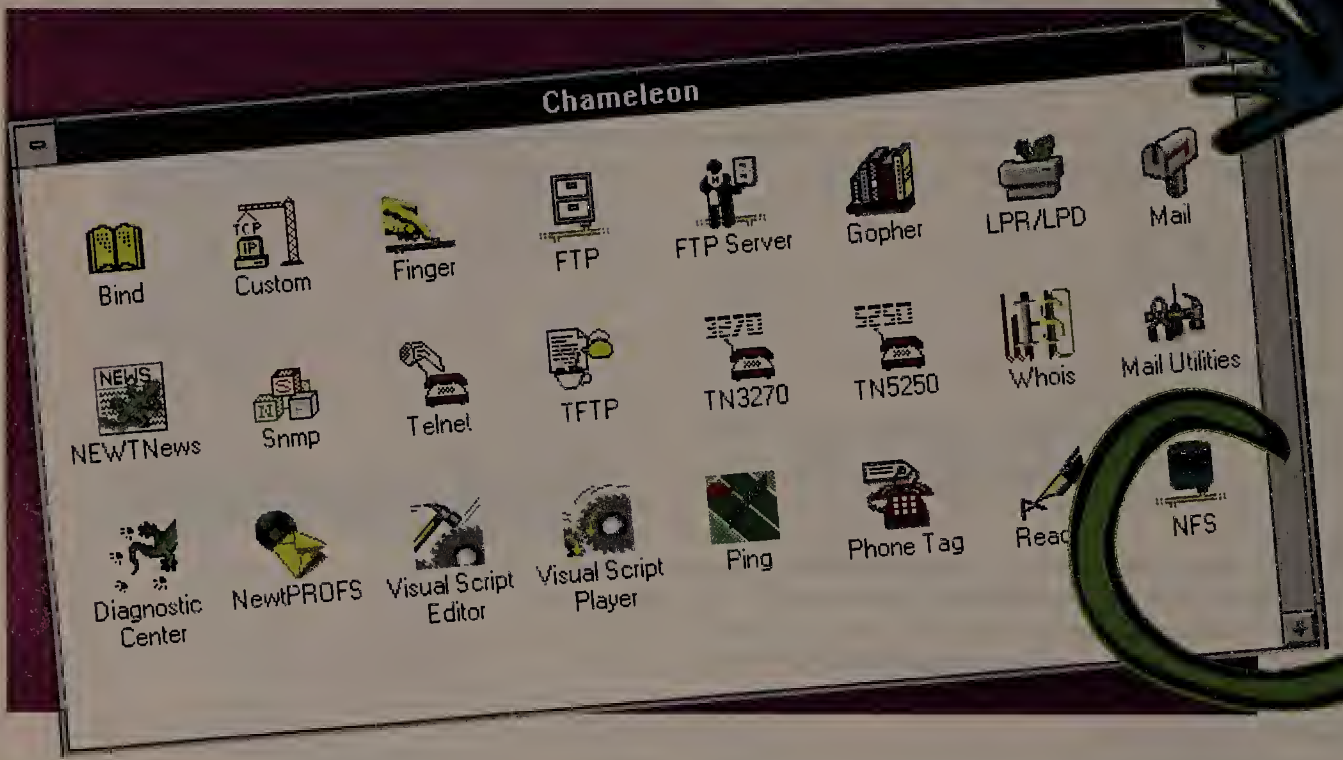
Traditional markets for engineering and entertainment visuals will draw users, but so will the trend toward data warehousing, which may accelerate interest in colorful graphics to spot trends in volumes of data, according to Richmond. "As companies get more and more data that they have to analyze, they want to visualize it, to take a look at it," he said.

TCP/IP Applications For Windows.

MICROSOFT® WINDOWS™ COMPATIBLE

yes NetWare Tested and Approved

Network Your PC To The World With Chameleon.



BEST VALUE.

Chameleon is a TCP/IP Windows software suite that offers more applications than any other product. It provides you with a comprehensive Windows solution for TCP/IP networking.

SEVEN INTEGRATED SOLUTION SUITES.

Chameleon includes seven integrated solution suites: terminal emulation, e-mail, file and printer sharing, remote access, network utilities, administration tools, and an easy point-and-click interface into the Internet.

SEAMLESS ACCESS TO OTHER HOST SYSTEMS.

Chameleon includes more applications that allow you to access information on Unix, mainframes, minicomputers, PC-based LANs and WANs, and the Internet.

OFFICE, HOME, AND REMOTE NETWORK ACCESS.

Connect to your network and the Internet via LAN or dialup access with one easy-to-use software package. Send and retrieve email, download files, print documents, login to remote hosts, and run client/server applications. Connect your PC to the world with Chameleon.

NetManage Chameleon includes WinSock TCP/IP and is 100% DLL. Chameleon requires only 6KB memory and installs in just 5 minutes.

Sept. 1994 Sept. 1994 Sept. 1994

© 1994 NetManage Inc. [illegible] North De Anza Boulevard, Cupertino, California 95014. U.S.A. Fax (408) [illegible] Specifications are subject to change without notice. All trademarks are property of their respective companies.

APPLICATIONS INCLUDED:

- Terminal Emulation
  - Telnet: VT100, VT200, TVI, TN3270, TN5250
  - Visual Script Editor & Player
- File Transfer
  - FTP Client & Server
  - TFTP
- File & Printer Sharing
  - NFS Client & Server
  - LPR/LPD
- Electronic Mail
  - SMTP Mail with MIME
  - Phone Tag
  - IBM PROFS
  - POP2, POP3, SMTP
- Internet Access
  - Gopher
  - Newsreader
  - WhoIs
- Network Utilities
  - Ping
  - Finger
  - Diagnostic Center/Trace Agent
  - DNS Client & Server
- WinSock TCP/IP
  - 100% DLL TCP/IP Stack
  - Windows install and setup
  - LAN: Ethernet, Token Ring
  - Dialup: SLIP, CSLIP, PPP & ISDN

SPECIAL OFFER **Buy CHAMELEON and get ECCO Simplicity for only $30!**

PERSONAL AND GROUP INFORMATION MANAGER

Shared Calendars, Phone Books, and Projects

One copy of ECCO Simplicity with each version of Chameleon purchased. Special offer good thru January 31 1995.

NETMANAGE™

(408) 973-7171
e-mail: sales@netmanage.com
World Wide Web: www.netmanage.com

ELECTRONIC
CURRENCY
CASH COW, 54

What's new on the wide, wide Web

A semiregular column with items of interest and amusement from the Internet.

'Net news

- The Web is widening. According to Forrester Research, Inc. in Cambridge, Mass., by 1998 the Internet will eclipse the likes of Prodigy and America Online. Forrester projects that the number of proprietary on-line service users will grow from 4.7 million today to 10 million in 1997. After that, the number will decline as consumers opt for the Internet. By the year 2000, Forrester said, there will be 6.7 million users of proprietary services vs. 22 million users of the World-Wide Web.
- Spry, Inc. in Seattle has released Mosaic In a Box, a one-disk software package that includes a Mosaic browser for the Web and an automated network sign-up through the more than 400 worldwide nodes of the CompuServe network. Spry said it will offer customized versions of the package for corporations that want to distribute Mosaic In a Box to their customers. The suggested retail price for the software is $49.95; connection rates include a $9.95 monthly fee and $3.95 per hour after the first five hours.
- Reacting to price breaks like this for Internet users, CompuServe said it will cut its 14.4K bit/sec. access rate from $9.60 per hour to $4.80 per hour (plus the $9.95 per-month fee for an ensemble of basic services) on Feb. 2.
- But CompuServe — not to mention rivals Prodigy and America Online — is feeling pressured by the impending arrival of The Microsoft Network in August. Pricing for the Microsoft Corp. offering, which will be available to Windows 95 users, has not been disclosed, but observers are convinced it will seriously undercut the rates of existing public data networks.
- Speaking of Internet strategies, Prodigy became, as expected, the first provider with a Web browser. The feature was launched Jan. 17. CompuServe and America Online are expected to follow suit.
- And IBM, which already claims 35,000 dial-up Internet users via its OS/2 Warp, last week at ComNet launched a business service for dedicated Internet links ranging in speed from 56K bit/sec. to T1. Advantis, IBM's networking arm, will handle the dedicated lines and firewall services. Pricing for the services has not yet been set, Advantis officials said.

New sites

- The Institute of Electrical and Electronics Engineers, Inc. (IEEE) home page (http://www.ieee.org), a separate page and complete issue of *The Institute*, a news supplement to IEEE's *Spectrum* magazine (http://www.ieee.org/ti.html).
- United Nations links, a Web page with links to information services at the UN (http://undcp.org/unlinks.html).
- Disability Mall, the first Web page for people with disabilities (http://disability.com/).

Just for fun

- The Real Beer Page, for devotees of craft brewing (http://and.com/realbeer/).
- VolcanoWorld. This Web site, funded by NASA, includes reports and pictures of the latest eruptions, photos of many other volcanoes, a developing virtual field trip and more (http://volcano.und.nodak.edu).

Tips and tricks

- The second edition of *The Internet Yellow Pages* (Osborne McGraw-Hill, $29.95) by Harley Hahn and Rick Stout. The authors have succeeded again in putting information about the most dynamic place in the world, the Internet, between two familiar covers. Best of all, the *Yellow Pages* is as witty as it is informative.
- One of the best jump-off points for 'net surfing is the Yahoo directory (http://akebono.stanford.edu/yahoo). This Web location, maintained by students at Stanford University, contains more than 25,000 uniform resource locators in its searchable database. More than 700,000 files are accessed from the site daily.

—Ellis Booker

Please keep us posted about items in this space. Contact us electronically at ellis@cw.com.

Networking standard promises clear picture

By Steve Moore

Building and maintaining an accurate map of a multivendor computer network is often an exercise in frustration. While a motorist can easily obtain a single map showing all the highways and byways in every state and county nationwide, a network manager must piece together maps of overlapping, vendor-specific domains that vary widely in geographic scope.

To ease this problem, Cisco Systems, Inc. in San Jose, Calif., recently launched an effort to develop a common format called Common Internetworking Topology Initiative (CITI). This was designed to allow different vendors' internetworking devices, network management platforms and network design and optimization tools to share configuration information (see chart).

The CITI, a standards group, is developing an ASCII-based, common interchange format with E-mail capabilities. This will allow a network manager to consolidate topology information from many different vendors' management tools into one cohesive network diagram.

VENDORS THAT HAVE AGREED TO PARTICIPATE IN THE CITI EFFORT INCLUDE THE FOLLOWING:

Accugraph
Cabletron Systems
Chipcom
Isicad
Ki Networks
Optical Data Systems
Remedy
SunSoft

Vendor reaction

Cisco plans to present CITI to the Internet Engineering Task Force as a potential formal standard. But whether CITI will attract broad support and be implemented quickly is still up in the air. Although some industry heavyweights, including Cabletron Systems, Inc. and SunSoft, Inc., have supported it, others such as Hewlett-Packard Co. and Bay Networks, Inc. are still evaluating it. And IBM has declined to support it altogether.

"We think it's important to work through established standards bodies like the Internet Engineering Task Force, the Network Management Forum and X/Open," said Lynn Wilczak, IBM's director of enterprise management platforms. "The resources it takes to put the right attention on all these separate small groups that are starting to form dilutes the [standards] effort overall," she added.

User reaction

Still, customers said they would welcome the standard. "It would be wonderful to see some standardization of network diagrams," said John Dubiel, manager of planning at Boston Edison Co. in Boston. However, he cautioned, "All the players have to play or it becomes a partial solution, and we're already being partial-solutioned to death."

Currently, getting an overall snapshot of a multivendor network "is virtually impossible from any one vendor console," said Fred McClimans, a principal consultant at Decisis, Inc. in Herndon, Va. The problem will only worsen as users implement "massive switched networks where topology information becomes critical because LANs are breaking up into multiple segments," he added.

Fireman's Fund Insurance Co. in Novato, Calif., avoided the problem of multiple, inconsistent topology formats by "standardizing early and sticking to our guns," said Virgil Pittman, the company's senior vice president of systems.

Fireman's uses IBM's NetView, is standardized on OS/2 workstations and has an internetwork based on IBM 3274 controllers rather than routers, he said. "Unless [the CITI participants] standardize on what I have now, I'm not going to spend a lot of money to go to a new standardized way of doing things," he said.

Speedy resolution

For companies that have not been so fortunate in building consistent computing and networking environments, CITI could bring significant benefits. "The thing that will make this initiative happen is to keep it simple technically and bring it to closure quickly. But if it takes three years to become official, who cares?" said John McConnell, president of McConnell Consulting Co. in Boulder, Colo.

Vendors of network design and optimization tools have expressed interest in the CITI effort, but none have become members yet. "The concept of a common [topology] interface standard is a good one, but it only solves part of the problem," said Steve Howard, president of Make Systems, Inc. in Mountain View, Calif.

There are key attributes that should be in the core standard but are not, Howard said. If, for example, his company's application requires something not provided in the standard, then Make Systems must somehow reconcile that problem, he said.

While different network management applications may produce diagrams that are functionally correct, Dubiel noted, "they don't come out physically the way you'd like them to look. You'd like some geographic sensibility to it, so the 20th floor doesn't end up higher on the diagram than the 19th floor."

Beyond the topology format issue looms the more difficult problem of standardizing the format of network traffic flow information. This would allow users to get a clear picture of the types and amounts of data traversing a network, even if many portions of that data are associated with different vendors' networking products.

YOU'RE LOOKING AT EVERY SYSTEM DEVELOPED EXCLUSIVELY FOR WINDOWS NT.

RISC server, RISCstation, See, Hear and Feel the Difference are trademarks of NEC Technologies, Inc. Pentium is a registered trademark of Intel Corp.
All other trademarks and registered trademarks are the property of their respective owners. ©1995 NEC Technologies, Inc. **NEC GSA #GSOOK94AGS5241.**

NEC RISCstation 2000

NEC Express RISCserver

You can look around all you like, but you won't find a system that can run Windows NT™ like NEC's RISCstation 2000™ or Express RISCserver.™ The reason is simple. While other workstations and servers are designed with multiple operating systems in mind, ours were designed exclusively for Windows NT (both are optimized for NT right down to the ASIC level). The result is speed. Up to two times the speed of Pentium™ processor systems. With superior floating point accuracy. If you're interested in that kind of performance, call 1-800-NEC-INFO for more hard facts. After all, if you've decided on Windows NT, why not consider the RISC systems that get more out of Windows NT.

MIPS RISC CERTIFIED POWER

MICROSOFT. WINDOWS NT.

SEE, HEAR AND FEEL THE DIFFERENCE.™

NEC

Electronic currency: A cash cow

By Gary H. Anthes

Just as currency long ago replaced barter in our society and more recently paper checks and plastic cards have supplanted currency, electronic payments may soon be an important — perhaps dominant — way to settle accounts.

Developers of electronic payment methods said the technology holds great promise for publishers, corporate users looking for a safe, inexpensive and easy way to make purchases and companies that see the technology's potential in billing and collection systems.

But a lack of standards and a host of thorny legal and political issues suggest that the widespread use of network-based payment mechanisms will not occur overnight (see story below).

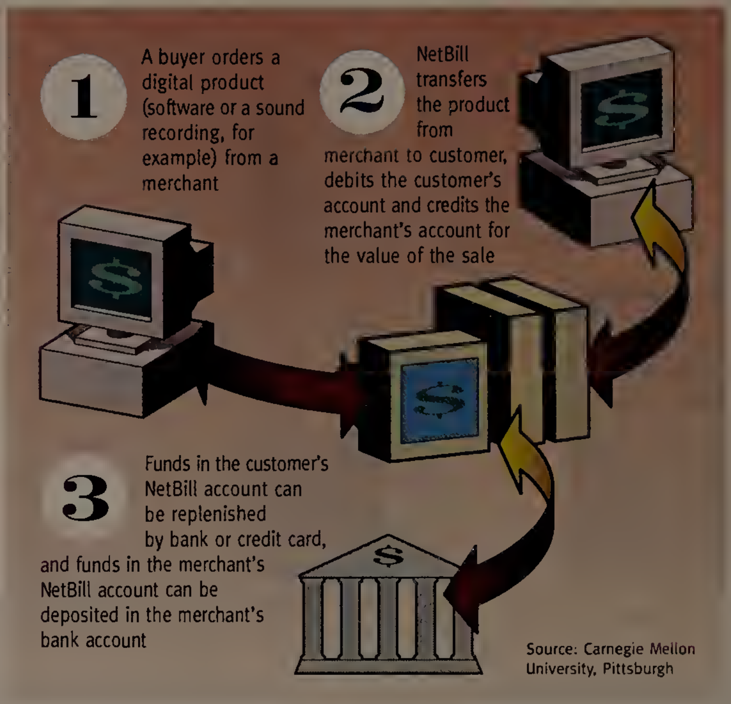
Some of the emerging electronic payment methods are based on ordinary credit-card transactions, which are protected by encryption for transmission over networks. Others resemble checks, and still others are more like cash. University research as well as fledgling commercial efforts are attempting to combine the advantages of these familiar mechanisms while sidestepping their respective drawbacks.

Reducing risk

For example, CyberCash, Inc. in Reston, Va., said its Internet-based credit-card service will use encryption technology to reduce the risk and cost associated with the use of credit cards by mail or telephone. CyberCash recently teamed with Wells Fargo Bank in San Francisco to introduce a service for electronic buying using credit cards.

Later this year, CyberCash plans to provide a hybrid service intended to offer the convenience of checks and the reliability of cash. Like a check, it can be used at a distance, but like cash, its validity can be verified instantly, said Stephen D. Crocker, senior vice president for development.

CyberCash uses encryption technology and a server that mediates transactions among buyers, sellers and banks. In the case of electronic cash, it receives, holds and transfers money balances much as a bank does.


1
A buyer orders a digital product (software or a sound recording, for example) from a merchant
2
NetBill transfers the product from merchant to customer, debits the customer's account and credits the merchant's account for the value of the sale
3
Funds in the customer's NetBill account can be replenished by bank or credit card, and funds in the merchant's NetBill account can be deposited in the merchant's bank account

Source: Carnegie Mellon University, Pittsburgh

Electronic cash is attractive when purchases are too small to be cost-justified as credit-card transactions, as when a user wants to buy a small amount of information from an on-line service provider. Carnegie Mellon University in Pittsburgh has developed NetBill for electronic "micropayments," which can be used reasonably for purchases as low in value as 10 cents, its creators said (see chart).

Systems such as NetBill will make it safe and feasible for publishers to sell information over the Internet, a distribution medium shunned by them so far. NetBill allows the publisher to send encrypted information to a buyer without sending the key to decrypt the file until a NetBill server has debited the customer's account and credited the vendor's account.

The university will set up a NetBill pilot by the end of the year and will eventually license the technology to one or more commercial services firms, the university said.

Another effort soon to go commercial is under way at the Information Sciences Institute (ISI) at the University of Southern California in Marina Del Rey. The technology is based on Kerberos security software, which allows access without sending passwords over the network.

ISI's NetCheque, which will be used in commercial applications by CyberSafe Corp. in Redmond, Wash., uses an "accounting server" — acting as a virtual bank — to allow electronic check-writing. This will let companies set up their own on-line "banks," integrating their internal accounting systems with the external banking hierarchy.

Mixed signals?

In the past year, a dozen or so firms have announced plans to offer products or services based on electronic credit-card, debit-card, check or cash transactions over the Internet. Will they result in a digital Tower of Babel?

"The hope is if you get a payment in one of these forms, you will be able to convert it automatically to another," said Clifford Neuman, a computer scientist at the ISI at the University of Southern California. "But I think it's going to be a while before we see that. First we'll go through a period where a lot of things don't talk to each other, unfortunately."

A lack of standards for interoperability is not the only impediment to the widespread use of electronic cash. Last year, the Cross-Industry Working Team, a group of communications, computer, information and service providers, said in a report that digital cash raises issues of safety, privacy, regulation, administration and computer crime that have barely been considered, much less solved.

"The decisions and collective wisdom not just of financial and technology experts but of public policy-makers and ultimately of ordinary consumers, will be needed to realize the potential benefits of this emerging technology," the group wrote.

— Gary H. Anthes

New Products

Eicon Technology Corp. has announced Universal Access, PC-to-SNA software.

According to the Montreal company, Universal Access includes 3270 and 5250 clients for Microsoft Corp.'s Windows, Windows NT, DOS and OS/2.

The product comes with Advanced Program-to-Program Communications subsystems for DOS and Windows that provide access to mainframe, midrange and peer-to-peer resources. Access Tools, a set of Visual Basic controls for developing front-end and client/server applications, is also included.

Universal Access software is priced at $21,875.

▶ *Eicon Technology*
(514) 631-2592

T3plus Networking, Inc. has announced T3plus Command Management System software.

According to the Santa Clara, Calif., company, T3plus Command Management System manages high-speed broadband communications among multiple locations in point-to-point configurations.

Users can perform management functions across all network nodes at one time instead of on a node-by-node basis. Other features include circuit additions, deletions or modifications and fault management.

T3plus Command Management System costs $4,000.

▶ *T3plus Networking*
(408) 727-4545

Announcing a new service from Computerworld:

COMPUTERWORLD RAPID REFERENCE

Get the article you need – when you need it.

Computerworld articles can help you nail down a sale, make a critical hire or get up to speed on an important topic.

- Just call CW Rapid Reference and we'll send you any article from any issue of Computerworld, Computerworld Premier 100, Computerworld Client/Server Journal and Computerworld Campus Edition by fax, overnight delivery or regular mail.
- Search by any name or subject and get just the information you want.
- Prices begin at just $9 for the first article and $6 for additional articles.

Additional charge for fax or overnight delivery.

call 1 (800) 343-6474, ext. 554

COMPUTERWORLD
Microsoft plans database unity
Sculley exits Apple; multimedia in future?

COMPUTERWORLD CLIENT/SERVER JOURNAL

COMPUTERWORLD Campus edition

COMPUTERWORLD PREMIER 100

Router vendors emphasize integration

By Stephen P. Klett Jr.

■To compete in the low-end router market, vendors are struggling to leapfrog one another by cramming as many bells and whistles as possible into their platforms while keeping prices low.

Micom Communications Corp. and Dynatech Communications, Inc. threw their respective hats into the ring recently.

Micom, based in Simi Valley, Calif., unveiled the NetRunner Integration Router family at last week's ComNet trade show in Washington. NetRunner, which supports Novell, Inc. IPX and TCP/IP routing, will integrate voice, fax, legacy and LAN traffic. Two branch office and two central site models are included in the family. Prices range from $2,450 to $12,000.

On the rise

Metric Technologies in Boston estimates WAN traffic growth will be in excess of 30% a year.

Dynatech Communications, a subsidiary of Dynatech Corp. in Woodbridge, Va., last week launched the DynaStar 100 router targeted at branch office networks. The DynaStar 100 supports concurrent IP and IPX routing over wide-area via frame relay and X.25, and it offers bridging and LAN dial-in/dial-out capabilities. Prices start at $2,495.

The DynaStar 100 also offers an expansion slot to which users can add more Ethernet, Token Ring, Integrated Services Digital Network (ISDN) or wide-area network ports. It supports Simple Network Management Protocol management and remote reconfiguration and software updating, Dynatech officials said.

"Remote-access vendors are consolidating a lot of functionality into a single box, which is good because as a branch manager you really want to have a multifunction platform to help reduce management costs," said John Morency, principal analyst at Strategic Network Consulting in Rockland, Mass.

Users agreed.

"Remote routers have to be cheap and easy to maintain. You have to be able to put them on the top of a shelf somewhere and forget about them," said Bill Blackmer, senior information support analyst for Marin County in Novato, Calif. "If not, we're in deep doo-doo because we'd have to hire eight more of me just for" router management, Blackmer added. Remote routers from 3Com Corp. play a crucial role in the county's ongoing project to link area schools and businesses to a countywide internetwork [CW, Nov. 21, 1994].

To help ease the administrative burden associated with multiprotocol routing, Micom includes a technology called EasyRouting with the NetRunner line. EasyRouting software eliminates the need to set up and maintain complex routing tables and performs local protocol "spoofing" to keep local broadcast traffic off the WAN, Micom officials said.

Connectivity overload

Branch office routers are becoming increasingly flexible

Vendor/ product	Features	Price
Dynatech DynaStar 100/100I	1 Ethernet port 3 WAN ports 1 asynchronous port 1 expansion slot	$2,895 $2,495 (ISDN version)
Micom NetRunner 75E	1 WAN port 2 asynchronous ports 1 dial backup port (Optional: CSU/DSU, ISDN, modem)	$2,450

Analysts and users praised the feature sets the two companies brought to the remote-access table but added that both have a huge mountain to climb to compete with the likes of Cisco Systems, Inc., Bay Networks, Inc. and 3Com.

"Any new player in the internetworking market is at a disadvantage in competing with the name brands of the entrenched players. A lot of their success will depend on how well they interoperate" with routers from the bigger companies, Morency said.

Name recognition is also a challenge.

"Dynatech is a $500 million company, but when you mention their name, people say, 'Who?' " said John Holdefehr, assistant vice president of network operations at Shaw Data Services in Fairfield, N.J., which is beta-testing the DynaStar routers.

"Reliability is our No. 1 concern, and since Dynatech is new, we will have to do very rigorous testing before we roll them out to our clients," Holdefehr said. "However, on paper they are the vendor that best meets our needs."

He said he particularly likes the DynaStar 100's ability to send mainframe traffic over the LAN using frame relay as well as its ISDN support. Shaw Data could be a big win for Dynatech. The portfolio management company has hundreds of clients in the U.S., and if all goes well with the pilot, a majority of them may be outfitted with Dynatech routers by the end of the year, Holdefehr said.

Briefs

NetLabs' debut

NetLabs, Inc. released a version of its NetLabs/Vision Development Environment, which runs on IBM's AIX, Hewlett-Packard Co.'s HP/UX and Sun Microsystems, Inc.'s SunOS platforms. It lets network administrators create Open Software Foundation Motif applications to visually control, configure and monitor Simple Network Management Protocol devices on TCP/IP networks. The product is available for $10,000 per development station.

House goes on-line

The U.S. House of Representatives' World-Wide Web site (http://www.house.gov) went into operation last week. The House Web site uses text-search software from **Personal Library Software, Inc.** in Rockville, Md. Users will be able to search U.S. Code and the Code of Federal Regulations as well as follow links to legal works.

Wireless messaging

Pagers boost mobile arsenal

By Michael Fitzgerald

Paging may be part of your messaging future.

Socket Communications, Inc., a small maker of PC Cards in Fremont, Calif., is working with Paging Network, Inc. and its PageNet network to make paging more attractive to companies with large numbers of mobile users. The Socket/Paging Network combination is the key to Apple Computer, Inc.'s Apple Mobile Message system announced at Macworld two weeks ago. And Socket Communications and Paging Network are expected to roll out the PageCard Wireless Messaging System for Windows today.

For $399, a user gets a Type II PC card with a pager window on it. The card fits into a notebook or other portable device with a PCMCIA slot and can be used as a stand-alone pager. The PageNet service costs $19.99 to activate, and the lowest monthly charge is $19.95 for 75 messages.

The initial service will support Microsoft Corp.'s Mail messaging package. Lotus Development Corp.'s CC:Mail will be supported in March, and support for Novell, Inc.'s Message Handling Service is expected in early April. Support for Notes is scheduled for June.

The PageCard Wireless Messaging service will help lower costs, according to the two companies. For instance, instead of having to log on to receive messages, a user with PageCard can simply plug the card into a notebook to read messages on screen.

Cost-saver

Murray L. Dennis, Socket's president and chief executive officer, said a message can be sent to one person or 1,000 people for the same price over the PageNet network. This would reduce the amount of time mobile workers spend on-line and achieve lower telephone costs than in a wired environment, he said.

"That is potentially interesting. We could utilize that because we use the text-based pagers now," said Kyle Cooper, a telecommunications specialist at the American Cancer Society in Austin, Texas.

Cooper said he would have to examine PageNet closely because much of the group's paging is focused in its major sites in Austin and Atlanta. If a large group of people were traveling in the field, the network would have much clearer benefits, Cooper said.

PageCard *users can plug the card into a notebook to read messages on screen*

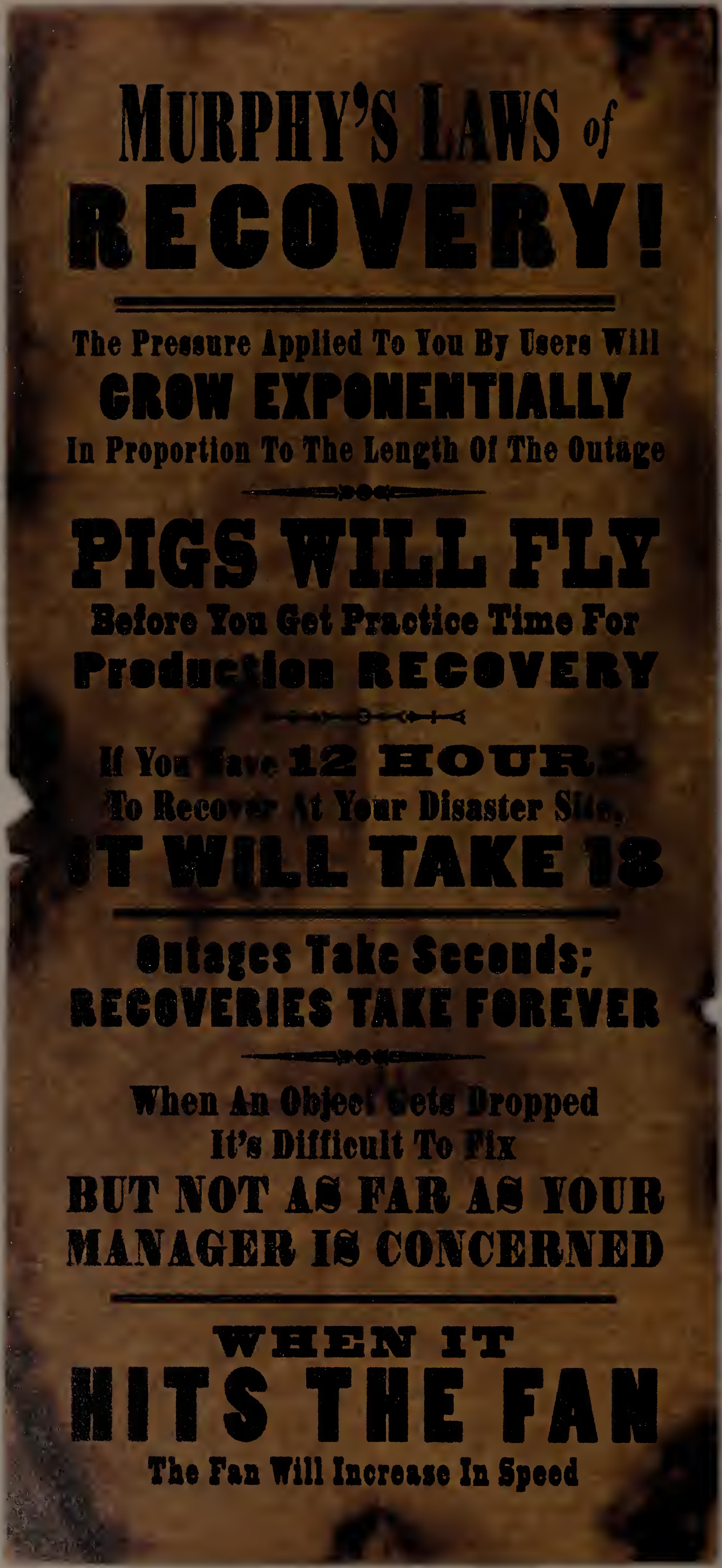
One advantage of the PageCard is that it is not limited to short, bursty messages like the typical pager. It has a 128,000-character memory. In conjunction with a messaging program, PageCard users can define what messages they want to receive according to subject, sender or other criteria for automatic forwarding to their location.

The product is limited to mail-forwarding applications but will expand to broader corporate mail networks, particularly as Socket increases its support for market-leading messaging vendors.

Depending on user response, Socket will also pursue links to Profs networks on IBM mainframes and DECmail for Digital Equipment Corp.'s large systems.

Top dog

PageNet is the dominant paging network in the U.S., with 4.3 million subscribers. The next three largest paging companies have 4.4 million subscribers, according to RCR Publications, Inc. in Denver.



MURPHY'S LAWS *of*
RECOVERY!

The Pressure Applied To You By Users Will
GROW EXPONENTIALLY
In Proportion To The Length Of The Outage

PIGS WILL FLY
Before You Get Practice Time For
Production RECOVERY

If You Have 12 HOURS
To Recover At Your Disaster Site,
IT WILL TAKE 18

Outages Take Seconds;
RECOVERIES TAKE FOREVER

When An Object Gets Dropped
It's Difficult To Fix
BUT NOT AS FAR AS YOUR
MANAGER IS CONCERNED

WHEN IT
HITS THE FAN
The Fan Will Increase In Speed

Murphy never heard of BMC's new RECOVER PLUS® tools for DB2*

All he knows is that as your requirements become more complex, your need for better strategies and faster recoveries will also increase.

That's why a function-rich toolset is essential.

BMC Software's new RECOVER PLUS tools for DB2, RECOVER PLUS, R+/CHANGE ACCUM™ and R+/RESOURCE MAXIMIZER™, give you more recovery options and faster recover times than any other products currently on the market.

Our RECOVER PLUS tools allow you to:

- ☛ *Decrease recovery time by a factor of four*
- ☛ *Recover dropped objects quickly*
- ☛ *Pre-process DB2 logs*
- ☛ *Migrate at high speed*
- ☛ *Use image copies not registered with DB2*
- ☛ *Sort log records before applying to table space*
- ☛ *Make up to four image copies during recovery*
- ☛ *Recover table space and index partitions concurrently*
- ☛ *Create image copies from prior image copies and logs*
- ☛ *Nondestructive recovery testing*

After all, you don't want recoveries to be your only opportunity to meet upper management...

Call **800 285-4BMC** for more information.

IBM Business Partner

BMC®
SOFTWARE

BMC Software international offices are located in Australia, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, Spain and the United Kingdom. BMC Software, the BMC Software logo and all other product or service names are registered trademarks or trademarks of BMC Software, Inc. in the USA and in other select countries. ® and ™ indicate USA registration or USA trademark. *DB2 is a registered trademark of IBM Corp. BMC Software is an Equal Opportunity Employer.
© 1995, BMC Software, Inc. All rights reserved.

Users laud IBM reorganization — for now

By Craig Stedman

A new sales and service organization built around 13 vertical industries has formally taken effect at IBM. The move was met with applause from customers, who said they hope the changes will help the computer giant get to know their businesses better.

"It's too early for me to tell that it's been a success, but clearly the intent is correct," said Jon Gorney, executive vice president of National City Corp., a Cleveland-based bank.

Some of the 13 new vertical units are further along than others, "but everything has an industry focus," an IBM spokesman said. The company began reorganizing along vertical industry lines last spring [CW, April 25, 1994], and the new structure was gradually put in place during the remainder of 1994. It officially took effect at the start of the new year.

However, some users noted that the downsizing of IBM's sales force in recent years remains a big concern. Customers outside of the top tier of IBM accounts sometimes have trouble getting attention, these users said, and even large shops have seen sharp cuts in the number of IBM workers assigned to them.

While several IBM customers said the impact of the changes cannot be rated yet, they gave the vertical industry concept a strong thumbs-up.

Lee Nelson, chief financial officer at Color Me Beautiful, Inc., a small cosmetics vendor in Chantilly, Va., said he lobbied IBM to move to a vertical industry focus when he sat on its customer council several years ago. The change should help produce salespeople who "come in and know what we're all about" rather than having to take lessons from users, he said.

Being able to tap the knowledge base of a vertical industry unit would be especially beneficial to a company the size of Color Me Beautiful, which cannot afford to maintain a large information systems staff, Nelson added.

Kansas City Southern Railway Co. in Missouri has shared an IBM account team with two other transportation concerns in that area for the past three years. The arrangement has helped it get input on technology "from the outside world," said Wayne Pattison, director of data center operations.

"I don't know if we've gotten better service from IBM, but the people that call on us are more attuned to what we do and what we're all about," Pattison added. "We don't have to explain to them what's going on, and that's a plus."

Ed Wehner, manager of business information systems at MEMC Electronic Materials, Inc. in St. Peters, Mo., agreed that the vertical industry structure is "a good idea." But he said his company, a maker of semiconductor wafers, is having trouble just getting in touch with its local IBM sales office.

With all of the cutbacks made by IBM, "they're spreading things a little bit thin," Wehner said. "That's where this [reorganization] is kind of falling down." MEMC has to rely on personal relationships it developed in recent years with IBM's development and support groups, he added.

Other users have also complained about a reduced level of attention in the wake of IBM's downsizing. Gorney said National City's IBM account team had been cut from 18 to nine in recent years but without a major impact on the level of service the bank receives.

Take responsibility

IBM managed to carry off the sales force reorganization without any noticeable impact on revenue, which exceeded expectations in each of the past three quarters, said Sam Albert, an independent consultant in Scarsdale, N.Y. The new structure puts the onus for meeting revenue targets squarely on the shoulders of the vertical unit managers, he added. "Pointing to IBM's product divisions is not an excuse anymore."

Waste-to-energy firm uses imaging to dam paper tide

By Thomas Hoffman
FAIRFIELD, N.J.

For a company that manages 28 waste-to-energy facilities throughout North America, Ogden Projects sure had a lot to learn about conservation.

That is because the $700 million subsidiary of New York services giant Ogden Corp. used to store all of its purchase orders, invoices and other back-office accounting documents from its energy plants in a mountain of paper files here and at a records retention warehouse in Newark, N.J. But that has all changed with the recent installation of an IBM AS/400-based imaging system designed to streamline the flow of documents among Ogden Projects' facilities, which are as far-flung as Dartmouth, Nova Scotia, to its headquarters here.

When the company broke ground for its newest facility in Montgomery County, Md., in 1993, "We estimated our paper flow at 2 million pieces a year and counting," said Donald F. Warga, manager of systems and programming at the unit. "Obviously, we had to find a better way to manage our internal paper flow."

Best way to proceed

Ogden Projects did not decide to install an imaging system until a group of IBM consultants reviewed its operations in March 1993. Ogden Projects hired IBM to determine how it could best redesign its storage and retrieval operations to handle the vast amount of paperwork the company is legally bound to preserve for all of its plants.

Following the study, Ogden Projects decided to maintain the past three years' worth of documentation from each plant at its Newark, N.J., records center for legal purposes. The company also decided to funnel its daily volume of paperwork through the imaging system, Warga said.

"Every time Ogden Projects built a new facility, they generated additional paperwork and needed extra clerical staff to handle it," said Joanne O'Neill, an IBM image consultant.

For example, Ogden Projects already had a computerized accounts payable system in place, but that merely tracked the paperwork manually — a tall order for a unit that handles more than 50,000 claims a year from as many as 12,000 vendors.

So in June 1993, Ogden Projects moved forward on Armonk, N.Y.-based IBM's advice to install an imaging system. The system, which cost approximately $500,000, includes an IBM 3995 Optical Library Data Server and an Eastman Kodak Co. High-Volume Image Link 900 Scanner. The hardware, which runs off of Ogden Projects' AS/400 Model 310 machine, is operated using IBM's ImagePlus/400 software.

Warga said he expects the system, which has been in production since January 1994, to pay for itself in 3½ years.

REINHOLD SPIEGLER

Donald F. Warga says Ogden Projects *was motivated to find a better way to handle the 2 million pieces of paper it generated in 1993*

Easing the load

A few of the 12 staffers who manage Ogden Projects' accounts payable department said the system has helped make their workload more manageable this past year.

"We're dealing with so much volume here that it really makes a system like this viable," said Ed Anderson, an imaging clerk who was hired last November to scan the documents into the system. "Rather than having three years of files in this building, the imaging system takes up a lot less space," Anderson added.

"I think it's wonderful," said Jayne Gorab, an accounts payable clerk who is linked to the system through an IBM OS/2 gateway. "It's so much easier to sit at your desk and retrieve files on your computer screen than to get them from the file room."

In the past, Gorab said, it took her up to half an hour to locate an invoice in the file room and

Waste to energy, *page 61*

ON SITE

Ogden Projects
Fairfield, N.J.

Challenge: To implement an automated system that will improve the high-volume production of paperwork among the unit's 28 waste-to-energy treatment plants.

Technology: IBM 3995 Optical Library Data Server; Kodak High-Volume Image Link 900 Scanner; IBM AS/400 Model 310; and IBM ImagePlus/400 and ImagePlus/Workstation software.

Result: Retrieval of invoices improved from 30 minutes to a matter of seconds; return on investment expected in 3½ years.

Progress introduces application developm

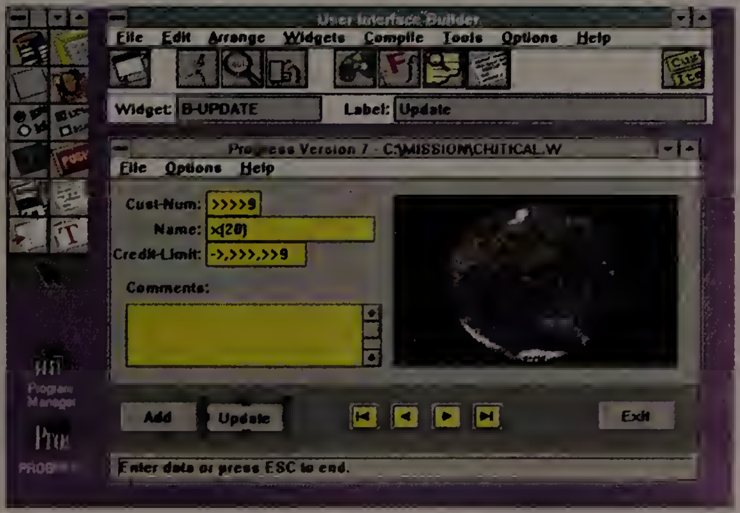
PROGRESS SOFTWARE For upcoming seminars, call 1-800-989-3773, ext. 165.

© 1993 Progress is a registered trademark of Progress Software Corporation.

ent software with significantly more depth.

These days, everybody and their brother is offering client/server development software with GUI capabilities. GUI, that is, and not much else. Now, introducing PROGRESS® Version 7. The client/server development software with an unprecedented mix of graphical capability and depth. And the only GUI development tools powerful enough to take you from pilot projects to even the toughest mission-critical, client/server applications.

Version 7 also lets you create GUI or character-based applications for client/server, host-terminal or mixed configurations. And the applications are portable across a wide range of databases, network environments, operating systems and hardware platforms. Plus, your applications are scalable, portable and reconfigurable without recoding. The result? Increased flexibility to help simplify the move to client/server. And, an investment in applications and systems that stays protected over time. So call the telephone number below to witness PROGRESS Version 7 in action. At which point, we'll promptly bury the competition. *Call 1-800-989-3773 ext. 165 to qualify for a specially-priced Version 7 test drive.*



Widget: B-UPDATE Label: Update

Progress Version 7 - C:\MISSION\CRITICAL.W

Cust-Num: >>>>9
Name: x(20)
Credit-Limit: ->,>>>,>>9
Comments:

Enter data or press ESC to end.

PROGRESS VERSION 7. MISSION-CRITICAL MEETS CLIENT/SERVER.

Responsibility stays in-house in outsourcing partnership

By Mark Halper

Plenty of outsourcing deals have been cut over the years in which a team of vendors provide a swath of services with each team member providing a specialty such as data center outsourcing or LAN support.

But usually in these team arrangements, the customer designates one provider as the lead contractor, and that contractor serves as a single point of contact, assumes risk and has the ultimate responsibility for the project.

Halliburton CIO Dick Teel *says, 'We felt we could better manage than any of the contractors could'*

So outsourcing industry watchers agreed that the recent 10-year, $500 million contract signed by Houston-based Halliburton Energy Services was unusual. While Halliburton handed over the bulk of its information technology operations to Andersen Consulting, I-Net, Inc. and Power Computing Co., it did not name any of the three as the prime contractor.

Instead, Chief Information Officer Dick Teel said Halliburton signed separate contracts with each company and held on to management responsibilities itself.

"We felt we could better manage than any of the outsourcers could," Teel said. Halliburton chose the combination of vendors because it promised more variety of expertise than could a single vendor, he said.

The arrangement calls for Power Computing in Dallas to provide data center management, for Andersen in Chicago to provide application maintenance and client/server development and for I-Net in Bethesda, Md., to provide global networking and LAN support.

Sharing the wealth

Halliburton's contract with I-Net calls for the two companies to share the revenue derived when Halliburton brings one of its customers into I-Net's global telecommunications network. Halliburton sells oil exploration services to oil companies, many of which require satellite telecommunications in remote areas of the world.

"One of the disadvantages of the traditional prime/sub arrangement is sometimes you want to get to the [subcontractor] and the prime is in the doorway standing in the way," Teel said.

Steve McClellan, an outsourcing industry analyst at Merrill Lynch & Co., said he understood the sense in Halliburton's approach. "You don't see it happen very often that responsibility isn't given to a single vendor. But you keep a lot of control that way," he said.

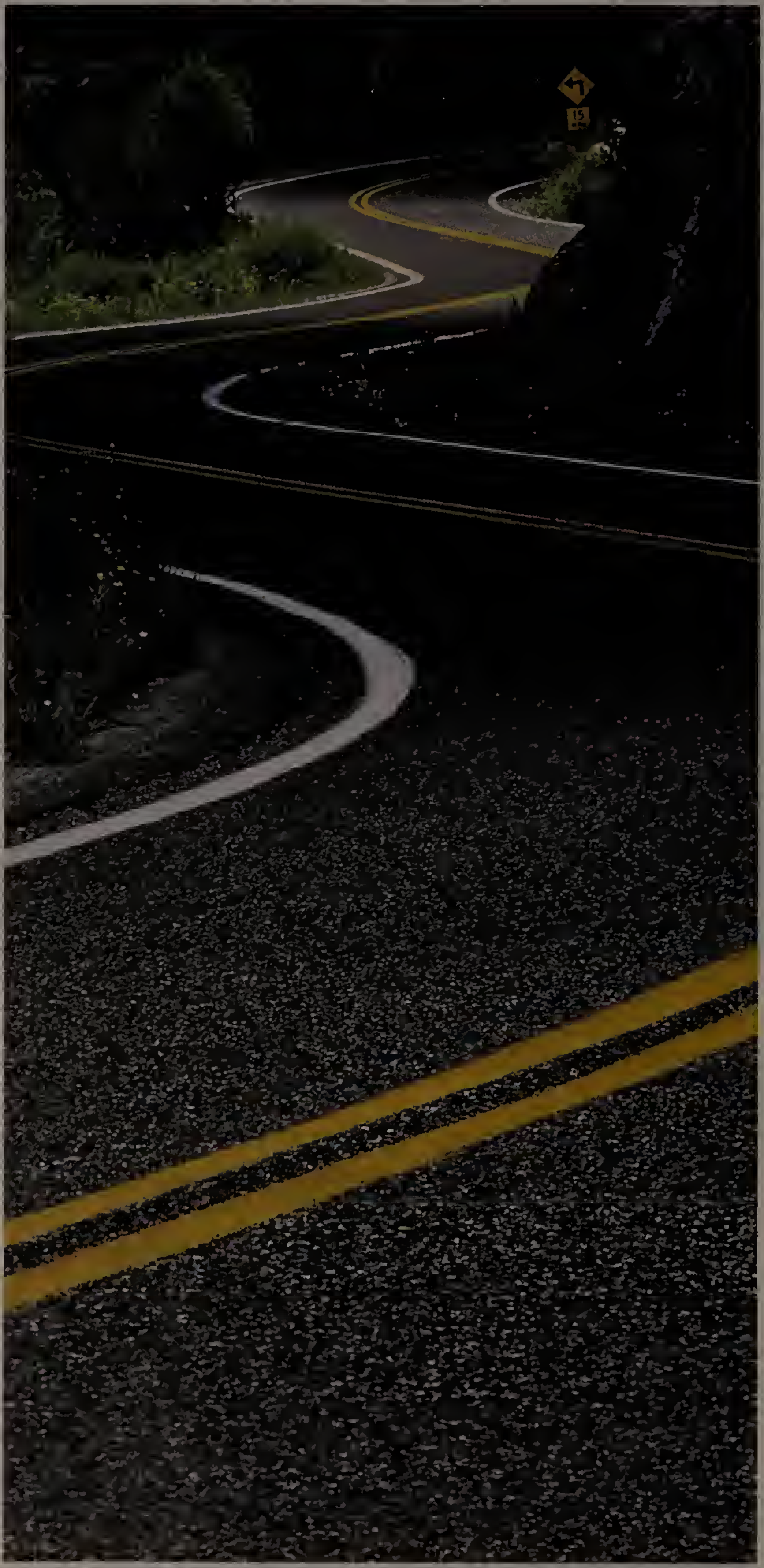
Rudy Hirschheim, an outsourcing consultant and professor of information technology at the University of Houston, predicted that the "no prime" arrangement will become more common because prime contractors add cost by charging for risk and responsibility.

A potential downside to Halliburton's decision not to name a prime contractor is coordinating all the vendors. No one seemed more aware of that possibility than Teel, who also said he recognizes the potential for vendor finger-pointing if things go wrong.

To minimize potential conflicts, Halliburton and the three vendors signed a joint vendor management agreement that spells out each vendor's precise responsibilities.

Some industry watchers were skeptical about that arrangement. "It's kind of like the United Nations has rules of conduct. Good luck; it doesn't always work," McClellan observed.

Which route would you take



Other parallel database software

New DB2 Parallel Edition

Outside North America, call Austria (0660 109), Belgium (02 225.33 33), Denmark (B030.4545), France (05 03 03.03), Germany (0130 4567), Italy (1670.18001), Netherlands (030 384040), Portugal (351 1.7915111), Spain (900.100 400), Switzerland
Information Warehouse is a trademark of International Business Machines Corporation. Oracle is a registered trademark of Oracle Corporation. © 1994 IBM Corp All rights reserved

Waste to energy

CONTINUED FROM PAGE 57

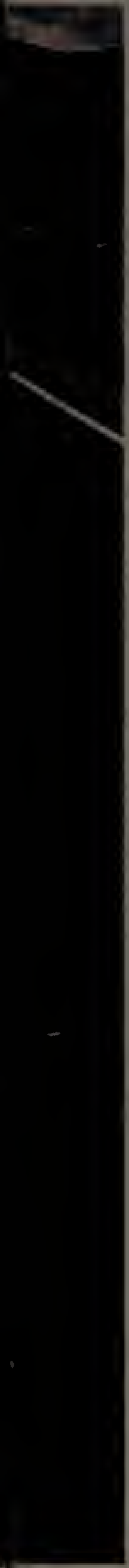
copy the necessary information. Now that those invoices are scanned and made available to users on-line the next business day, she can key in the invoice numbers to access a file within seconds.

Although some of the seasoned accounts payable clerks were initially computer-phobic, they eventually took a liking to the system after they discovered how easy it was to use, Anderson said. The imaging system "takes some getting used to, but once you're using it, you don't even think about it," Gorab agreed.

Look out for bugs

But despite its benefits, the imaging system still has a bug or two that needs to be worked out. For example, every so often, Gorab will receive a "document not found" message when she tries to retrieve a file. Warga said the company is solving some of these glitches, most of which are problems with the scanner, by rescanning the documents. "It's going to be a daily cleanup procedure," Warga added.

Ogden Projects is in a horse race with Wheelabrator Technologies, Inc. in Hampton, N.H., for the top spot in the North American waste-to-energy industry. Both companies have been challenged by legal issues that have cropped up among local county governments, such as whether municipalities have the right to dictate where waste in their area can be sent for conversion to energy. Those are among the forces helping to fuel Ogden Projects' and Wheelabrator's nascent international expansion, according to Marc Sulam, a financial analyst at Donaldson Lufkin & Jenrette, Inc. in New York.



to get information?

If you want to get in the fast lane, your choice is clear: parallel processing with new DB2® Parallel Edition. Parallel processing allows you to execute complex queries against huge databases in minutes, not hours or days. So analysis and reporting becomes a snap.

And as the chart below* shows, unlike its leading competitor, Oracle7, new DB2 Parallel Edition has *all vital functions* performed in parallel – which gives it a huge advantage in speed and scalability.

Parallel Function	*Oracle Parallel Query Option Version 7.1.3*	*IBM DB2 Parallel Edition Version 1.0*
Optimized for Parallel	No	Yes
Consistent Architecture with SP2	No	Yes
Index Scan	No	Yes
Inserts	No	Yes
Selects	Yes	Yes
Updates	No	Yes
Deletes	No	Yes

That means you'll actually be able to *use* all of your stored corporate data, for unparalleled insight into your customer and a big advantage over your competition.

So get the IBM benchmark data and white papers. And find out how to get ahead fast with new DB2 Parallel Edition – an IBM Information Warehouse™ solution.

Call 1 800 IBM-3333, STAR GA002

IBM DB2 Parallel Edition:

Software for Data Warehousing.

Industry-unique scalability.

All queries executed in parallel.

Support for parallel insert/update/delete.

Optimizer built for parallel execution.

OLTP/parallel query in one engine.

IBM®

5.4646), Turkey (90 212 2800900), or contact your local IBM office. *Information derived from trade articles and press releases. IBM and DB2 are registered trademarks and

New Products

ExecuSoft Systems, Inc. has announced ExecuSoft Office 2.0, a set of client/server applications for the IBM AS/400.

According to the Wayzata, Minn., firm, ExecuSoft Office 2.0 includes a 5250 emulator, a Windows-based PC support router replacement, a Windows AS/400 File Manager and a read/write Open Database Connectivity (ODBC) driver.

The ODBC driver will link most Windows applications to the AS/400 database. The File Manager module provides a standard Windows File Manager interface that lets users set up and initiate file transfers to and from the AS/400.

The product's 5250 emulation supports Windows standards and provides standard workstation functions, display station pass through, keyboard mapping, keystroke recording and playback capabilities.

ExecuSoft Office 2.0 costs $345.

▶ *ExecuSoft Systems*
(612) 449-0130

J. D. Edwards & Co. has announced WorldVision, PC-based windowing software that provides point-and-click access to J. D. Edwards' IBM AS/400 applications.

According to the Denver company, WorldVision maps AS/400 information into a Windows-style environment and provides users with a low-risk, client/server-style presentation.

WorldVision Run-Time Library incorporates all J. D. Edwards standard screens, and WorldVision Development Workshop tool kit lets users convert custom screens to WorldVision format.

A standard WorldVision configuration of 60 to 90 users costs $30,000.

▶ *J. D. Edwards*
(303) 488-4000

ATLANTA CAREERS

WILL BE FEATURED IN
COMPUTERWORLD'S
FEBRUARY 20
EASTERN EDITION.
DEADLINE: FEBRUARY 16, 3PM

1-800-343-6474, x228

EXECUTIVE
TECHNOLOGY
SUMMIT'95

from **SIM International** *&* **Computerworld**

May 3-5
The Pointe at Tapatio Cliffs,
Phoenix Arizona

Where top IS executives meet to get answers on:

- **Client/Server Technology**
- **Mobile/Wireless Computing**
- **Next Generation Databases**

For Registration Information, Call:
1-800-SIM-0035

The Summit

48 Hours
Designed by IS executives, for IS executives. Forty-eight hours of the most exclusive technology action of the year. You can't get better information faster.

Practitioners Forum
Get straight talk, from real practitioners. Four provocative sessions of hard-hitting, high-impact interaction. Industry leaders start right into your toughest questions.

Emerging Technologies
William J. Caffey, Vice President, Advance Technology Strategies, The Gartner Group, talks about integrating new technologies into existing applications. He tackles how to assess strategic benefits and justify purchases by bottom-line results.

Solution Labs
Ten interactive labs where you can put leading IT companies and their products through their paces with your peers. Your customized selection of these labs will provide you with opportunities to scrutinize working products on your own terms and come face-to-face with real practitioners who know the cost of making their decisions work.

The Practitioners Forum

Client/Server Computing

Leader:
Howard Anderson, Managing Director, The Yankee Group

Panel:
Steve Brooks, Executive Director of IS, Walt Disney Company

David P. Rodger, Vice President, Corporate Architecture, Sequent Computer Systems, Inc.

Tom Robben, V.P., Application/Strategic Architect, Core Cash & Security Systems, J.P. Morgan

Clifford Rushton, MIS Director, Federal Paper Board

Client/Server Computing

Leader:
Alan Alper, Editor, *Computerworld, Client/Server Journal*

Panel:
Tsvi Gal, Senior Vice President, Client/Server Systems, Bank of America

Robert Yellin, Chief Technology Officer, Legent Corporation

William Zeitz, President, Zeitz & Associates

Mobile/Wireless Computing

Leader:
Andrew M. Seybold, Editor-in-chief, *The Outlook on Mobile & Professional Computing*

Panel:
Enrique Crespo, Manager of Corporate Sales Systems, The Torrington Company

Chuck Parrish, General Manager, Mobile Data, GTE

Mike Radigan, Program Manager, USCO market-to-collections, Xerox Corporation

Sandy Sully, Vice President of MIS, 3Com Corporation

Next Generation Databases

Leader:
Richard Finkelstein, President, Performance Computing

Panel:
Michael Abbey, Database Administrator, Auditor General's Office of Canada

Ronald S. Elkin, Program Manager, Battelle Memorial Institute

The Summit sponsors are:

3Com
Networks That Go the Distance™

GTE

IBM®

LEGENT

Microsoft®

Price Waterhouse

PROGRESS SOFTWARE

SEQUENT
Our Business Is Your Success

SYBASE®
The Enterprise Client/Server Company™

High-end updates target Visual Basic

Vendors address trend with expanded capabilities

By Elizabeth Heichler

High-end client/server tool makers Cognos Corp. and Progress Software Corp. are giving their customers more options for using Microsoft Corp.'s Visual Basic.

In recent weeks, Cognos in Burlington, Mass., disclosed plans to include a Visual Basic-compatible scripting language and event-driven form designer in the next release of its Axiant client/server development environment (see story at right). Meanwhile, Waltham, Mass.-based competitor Progress likes Visual Basic so much it bought a company — Crescent Software, Inc. — that manufactures add-on products for developers using the language.

Users and other observers welcomed both vendors' plans.

At Dominion Textile, Inc. in Montreal, Visual Basic is now making inroads in what has been primarily a Cognos PowerHouse shop, according to Chief Information Officer Warren White. "It's good news to me that Cognos is bringing in Visual Basic capabilities," White said, adding that he would like developers to be able to code in Visual Basic within a robust environment such as Cognos' rather than have to use only the Microsoft language as a front end.

The moves by Cognos and Progress are part of an emerging trend, according to Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass. "Companies with high-end development systems say, 'There are as many as 1 million active Visual Basic users, and they're going to start hitting the wall. Why not go after them?' " she explained.

"There's a lot of momentum growing behind Visual Basic. This is an example of two established players lining up to add to that momentum," concurred Ed Acly, a director at International Data Corp. in Framingham, Mass. He said he expects more companies to begin focusing attention on Visual Basic.

Total package

Cognos customer David R. Doucette, a project manager at Wellesley, Mass.-based software vendor MultiTasking Systems, Inc., said he looks forward to being able to use a Visual Basic-compatible language from within Axiant.

"Visual Basic has a lot of good points, but it's still" a third-generation language, he said.

MultiTasking sells a lease accounting application. The company used Powerhouse Client for Windows to develop the front end for one product and Visual Basic to design the front end for another. Doucette said he hopes his company will be able to merge the two products when Axiant 2.0 is delivered later this year with the promised enhancements.

By enhancing Axiant with VisualWare, an event-driven screen painter that Cognos has licensed from InterGroup Technologies in Bellevue, Wash., the company will help resolve a problem another user has had with Axiant 1.0.

"The most disappointing thing has been that the GUI isn't what we'd like. That's why we're really pleased with Cognos' plans; it gives us everything we want," said Rob Wilson, a director at Information Specialists Ltd. in Cheshire, England. Wilson has been using the first release of Axiant to develop a project-tracking application for the construction industry.

The growing number of software components available to Visual Basic developers is also attractive to Wilson. "We want to plug in third-party technology whenever possible so we don't have to reinvent the wheel," he said.

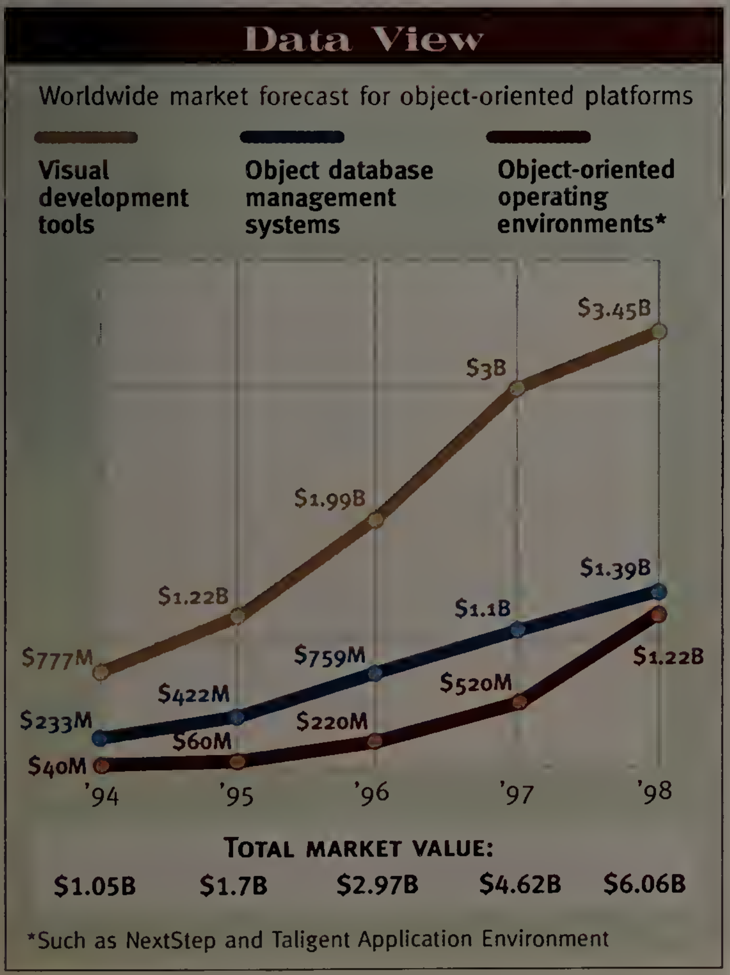
Progress' acquisition of Crescent will help legitimize the Visual Basic market by creating a solid, reliable source of compatible software components, said Ron Kalin, vice president of engineering at Business Matters, Inc., a customer fi-

Visual Basic, *page 65*

What's in store

Fourth-generation language vendors' plans to win Visual Basic users include the following:

- Cognos: The next release of client/server development environment Axiant, due in the fourth quarter, will include VisualWare, an event-driven, Windows-based forms designer from InterGroup Technologies in Bellevue, Wash. Axiant 2.0 will also include Softbridge Basic Language, a Visual Basic-compatible, embeddable scripting language from Mystic River Software in Cambridge, Mass.
- Progress: The company plans to support Visual Basic Custom Controls this year in Progress 7. It is also evaluating support for Microsoft's Object Linking and Embedding 2. Subsidiary Crescent Software will aim to deliver EnQuiry, a visual database application development tool, in the second quarter. Also on tap from Crescent is a Visual Basic compiler code-named "Stingray," which the firm claims will improve the performance of many Visual Basic applications when it is released in the second half of the year. — *Elizabeth Heichler*



Source: Input, Mountain View, Calif.

IBM's little database faces big battle

By Kim S. Nash

IBM announced a skinny single-user database last week aimed at consumers and small businesses. Due for delivery in mid-1995, Ultralite is IBM's answer to PC-based databases from Lotus Development Corp. and Microsoft Corp., officials said.

But IBM faces a strenuous workout on the industry Stairmaster to coax non-IBM shops to adopt its slim 4M-byte database, users and analysts said last week.

Crowded field

Microsoft's Access and Lotus' Approach are entrenched, and Oracle Corp. recently joined the junior database club with Personal Oracle 7 [CW, Jan. 16]. Sybase, Inc. plans to address the issue with the Watcom database it is expected to acquire via its proposed merger with Powersoft Corp.

Critical for any new database is support from third-party developers, which may or may not choose to write applications for the product. But the jury is still out. "I'd consider supporting it if it gained market share in six months," said David Gottholm, president of Eclipse Technology, a developer in Nashville.

Ultralite facts

Footprint:	4M bytes
Platform:	OS/2 Warp; support for Windows 95 is planned
Price:	Less than $100
Channels:	Retail stores or direct from IBM; Internet availability under discussion

IBM plans to bundle Ultralite with DB2 brethren databases in workgroup packages late this year, but for now, Ultralite is aimed at home buyers more than corporate users. The product, to be priced at less than $100, will include applets for "those catchy things people want to do at home," said Janet Perna, director of database technology at IBM's Toronto laboratory.

For example, when Ultralite hits the shelves at retailers such as CompUSA and Egghead Software in a few months, the package will come with programs for managing personal finances, tracking home wine cellars and keeping lists of phone numbers, she said.

The product will talk to other end-user applications through Open Database Connectivity links. Support for Microsoft's Object Linking and Embedding and OpenDoc, a connectivity standard under development mainly by IBM, Apple Computer, Inc. and Novell, Inc., could appear in Release 2.0 of Ultralite, Perna added.

Software AG to revamp state tax system

$15 million deal involves Natural, Adabas

By Rosemary Cafasso

The California State Board of Equalization — essentially the state's tax man — plans to spend $15 million in the next two years to revamp its legacy systems into one integrated set of tax applications.

Earlier this month, the agency announced a deal with Software AG of North America, Inc. in Reston, Va., to purchase the Adabas database management system along with Natural, a fourth-generation language (4GL), and a series of Natural development tools.

Efficiency is vital

The idea is to get rid of inefficiencies in tax management and processing that have resulted from relying on dozens of separate applications, said Burt Oliver, executive director of the California State Board of Equalization in Sacramento. Many of the applications were written in the 1960s and over the years have been patched and modified. Some have duplicate data and none of them can share information, Oliver said.

The California State Board of Equalization processes about 100,000 transactions per day using a combination of 540 on-line applications and 710 batch programs.

"Because of the way our tax programs grew, we have different [software] for each tax," Oliver said. "It is very inefficient and difficult to deal with."

Just one example: The sales tax systems alone work with a million active accounts at any given time, Oliver said.

To pull off this overhaul, the information systems staff will comb through current applications, collect common data, store the data in a new Adabas database and then rewrite applications to work with the new database management system.

The State Board of Equalization administers most of California's major state taxes, including consumer-use taxes such as excise, alcohol and cigarette taxes. In its 1993-94 fiscal year, the state pulled in $26.9 billion in revenue for state and local governments. To some observers, the Software AG contract is a thumbs-up for the soup-to-nuts development approaches that include the database, language and tools from a single source.

The California State Board's Burt Oliver *says a revamp is needed to expedite tax processes*

"The thrust so far [in the market] has been on the new wave of products," said Ed Acly, an analyst at International Data Corp. in Framingham, Mass. "But Natural is an extremely robust 4GL. So the idea that the old stuff isn't good anymore isn't always accurate."

Other observers, however, said they consider the deal just another example of an old-line company mining its customer base.

"There's no question that Software AG has landed some big contracts, but most of the time they have been selling into their installed base," said Donald Feinberg, an analyst at Gartner Group, Inc. in Santa Clara, Calif.

Although Software AG is a longtime software provider to the state of California, it won this bid over 10 other vendors, Oliver said.

"In terms of performance, flexibility and moving to client/server, we concluded that Ababas and Natural were the best and safest," said Bob Ferguson, a manager in the agency's IS group.

The agency kicked off the project in late 1994 and plans to complete development by May 1997. The staff has moved beyond planning to "requirements analysis," Ferguson said.

Briefs

XDB branches out

XDB Systems, Inc. in Laurel, Md., will embed its XDB Lite database into development tools from Symantec Corp., Micro Focus, Inc. and Platinum Technology, Inc.

Hitachi seals middleware deal with IBM

Hitachi Ltd. in Japan has signed a deal to develop message-oriented middleware based on **IBM**'s MQ Series technology. The Hitachi product, due out by September, will be written to the MQ Series application programming interface that controls messaging among different computer systems, the companies said. Hitachi initially plans to bundle the middleware with its transaction processing software for workstations and mainframes. The deal is the first time IBM has licensed the MQ Series to another vendor.

Informix buys part of ASCII

Informix Corp. in Menlo Park, Calif., has purchased the database division assets and software licenses of ASCII Corp., a leading Japanese software firm in Tokyo. Price was roughly 4.2 billion yen or $42 million.

OMG adopts object standard

The Object Management Group (OMG) in Framingham, Mass., has adopted the Common Object Services Specification Volume 2 (COSS 2), a specification on how to build four basic services into a Common Object Request Broker Architecture (CORBA) environment. COSS 2 will provide CORBA-conformant object request brokers with object transaction, externalization, relationship and concurrency control services.

Powersoft doubles 1993 revenue

Powersoft Corp. in Concord, Mass., last week reported 1994 revenue of $132.5 million, more than double its 1993 revenue of $57 million. The company also reported fourth-quarter results with net income of $4.2 million on revenue of $40.5 million.

A reminder that for enterprise-wide client/server development, integrated accounting, and decision support, slow is

Speedware Corporation is an international organization with 25 offices around the world, thousands of satisfied customers, and products with a proven track record.

[redacted]

Premia Corp. has announced Codewright Professional 3.1, an editor for C/C++, Assembler, XBase, Pascal, Cobol, Borland International, Inc.'s Paradox and Microsoft Corp.'s Visual Basic.

According to the Portland, Ore., company, Codewright Professional 3.1 lets users switch among build, file find, browse and other output windows.

A VDOS command shell lets users interact with DOS commands and associated output in a Codewright edit window, and a Help Indexer scans and indexes and a system's help file. The product lets developers extend search-and-replace operations across a list of project files in a single operation.

Codewright Professional 3.1 costs $249 for a single user or $995 for a five-user license.

▶ *Premia*
(503) 641-6000

Business Tools, Inc. has announced TAS Professional 5.0, a fourth-generation language database application development environment for DOS.

According to the Chapel Hill, N.C., company, TAS Professional 5.0 has added an integrated memory manager, mouse support, serial port communications and graphics capabilities.

The product includes a screen painter, program generator, source code editor, report writer, import/export routines and a data dictionary maintenance program. TAS Professional 5.0 uses the Btrieve database file manager as its file handler. It comes file ready and can be run in single or multiuser mode.

TAS Professional 5.0 costs $599.

▶ *Business Tools*
(919) 932-3068

Allen Communication, Inc. has announced Quest 5.0, a multimedia authoring system for Windows.

According to the Salt Lake City company, Quest 5.0 lets developers assemble graphics, text, audio, video motion, buttons and animations or set up branching and interactions.

Users can develop at the design level for overall structure and interactions or at the frame level to see exactly what the end user will see. Live objects let users modify object properties during both development and runtime.

A FastTracks feature lets users add their own context to prebuilt layouts, templates and menus, and a Dynamic Librarian lets users manage all data types in one library.

Quest 5.0 costs $3,995.

▶ *Allen Communications*
(801) 537-7800

Objectshare Systems, Inc. has announced WindowBuilder Pro for IBM Smalltalk and VisualAge, a user interface builder.

According to the San Jose, Calif., company, WindowBuilder Pro lets programmers build applications without in-depth knowledge of the underlying Motif windowing system in Smalltalk.

Editors are included for native widgets and generic controls. A callback editor integrates the window into the application; an attachment editor helps specify what happens when a window is resized; and a properties and templates editor provides customization for code generation and other editors.

Controls built with the product can be combined into higher-level controls such as spreadsheets and business graphics.

WindowBuilder Pro costs $495.

▶ *Objectshare Systems*
(408) 727-3742

Lexicus Corp. has announced Lexicus Longhand, handwriting recognition software for developing cursive writing-based applications for the Windows for Pen Computing operating system.

According to the Palo Alto, Calif., company, Lexicus Longhand recognizes and corrects natural handwriting.

A 25,000-word customizable dictionary immediately corrects errors, anticipates common user words and recognizes proper nouns. The product has a recognition speed of 12 characters per second.

Lexicus Longhand costs $149.

▶ *Lexicus*
(415) 462-6800

Revelation Technologies, Inc. has announced OpenInsight 2.5, a repository-based development environment for programmers of Windows applications on LANs.

According to the Stamford, Conn., company, OpenInsight 2.5 provides a mirrored repository that lets systems administrators apply a mirror to the main repository table so the system can recover from a fatal repository file corruption.

A report designer lets users modify reports and access OpenInsight data without programming.

OpenInsight 2.5 costs $895 per developer.

▶ *Revelation Technologies*
(203) 973-1000

Soffront Software, Inc. has announced Track for Windows 2.0, bug tracking software.

According to the Milpitas, Calif., company, Track for Windows 2.0 uses a customizable database to define bugs and inform users of new bugs and the status of bug fixes.

The product includes a query mechanism, text and graphic report formats, a change history, automatic notification, multiuser access, security and import/export capabilities. Track for Windows 2.0 is based on a query-by-example model that lets users enter a query by filling out the same familiar form used to record the defective data.

Track for Windows 2.0 costs $495.

▶ *Soffront Software*
(408) 263-2703

Visual Basic

CONTINUED FROM PAGE 63

nancial software developer in Waltham, Mass. The company is using Visual Basic as one of its main development environments, he said.

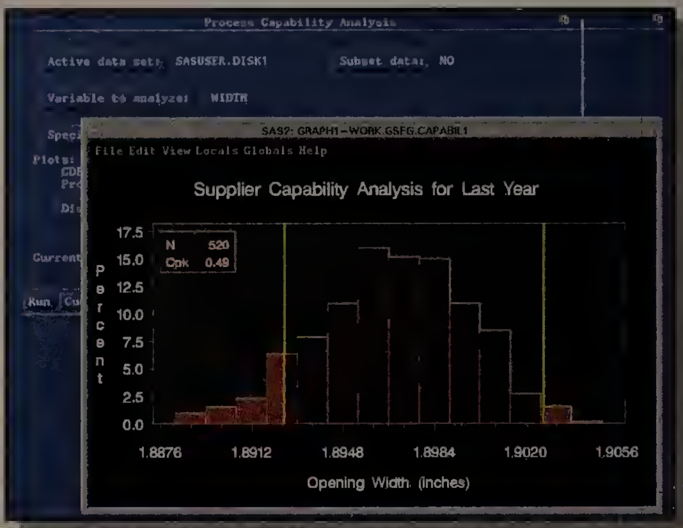
"The problem with Visual Basic add-ons or components is that lots of mom-and-pop operations are doing them, and sometimes components from very small companies can be flaky or low quality," Kalin said. "Those who want to use components are faced with the problem of how to sort out the garbage from the good stuff. Progress can invest quite heavily to become a one-stop shop for Visual Basic add-ons."

He added, "The industry as a whole has not given enough attention to Visual Basic as a true development language. Visual Basic has great potential."

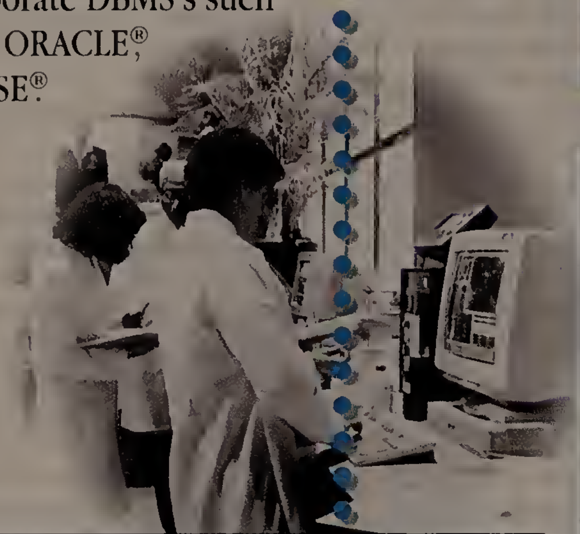
SPEEDWARE
BECAUSE SLOW IS DEAD
ot an option. Call us for the speed you need. 1•800•276•9950

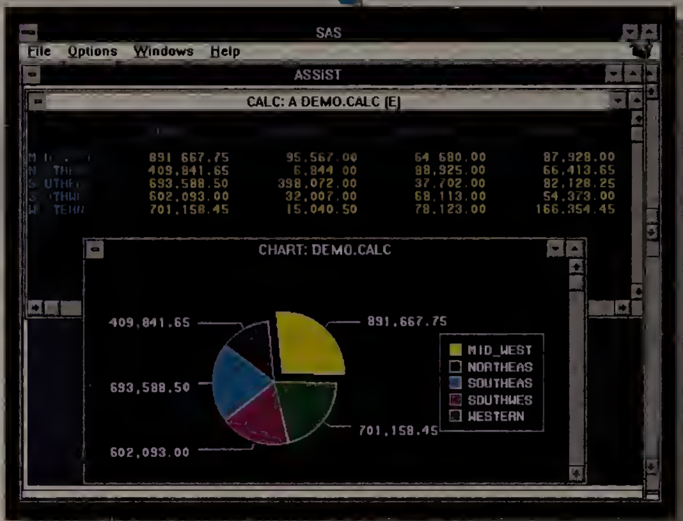
The Client/Server Soluti

The SAS System for Information Delivery is a new concept in client/server software. It provides workable strategies for overcoming the barriers that stand between people and the information they need. For instance, the SAS System strategy for **universal data access** makes it easy to reach all your diverse "islands of information"— including host system files, flat files, and corporate DBMS's such as DB2®, ORACLE®, and dBASE®.

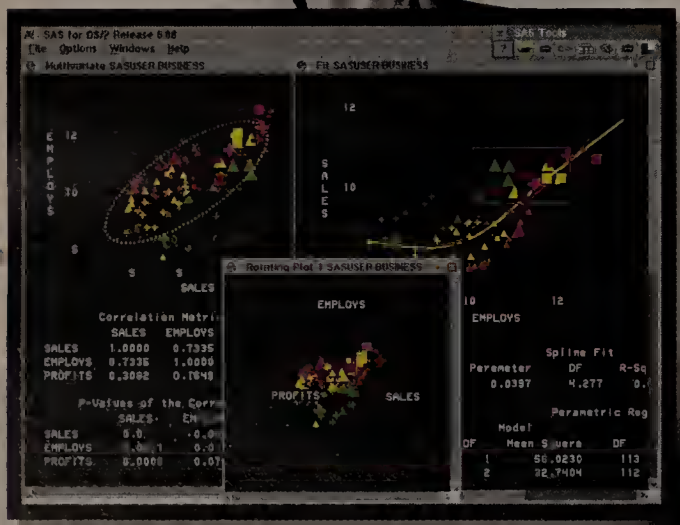

Process Capability Analysis
SAS?: GRAPH1 - WORK.GSFG.CAPABIL1
File Edit View Locals Globals Help
Supplier Capability Analysis for Last Year
N 520
Cpk 0.49
Percent
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
1.8876
1.8912
1.8948
1.8984
1.9020
1.9056
Opening Width (inches)
Run

```
Active data set: SASUSER.DISK1          Subset data: NO
Variable to analyze:  WIDTH
```





```
   891,667.75    95,567.00    64,680.00    87,928.00
   409,841.65     6,844.00    88,925.00    66,413.65
   693,588.50   398,072.00    37,702.00    82,128.25
   602,093.00    32,007.00    68,113.00    54,373.00
   701,158.45    15,040.50    78,123.00   166,354.45
```

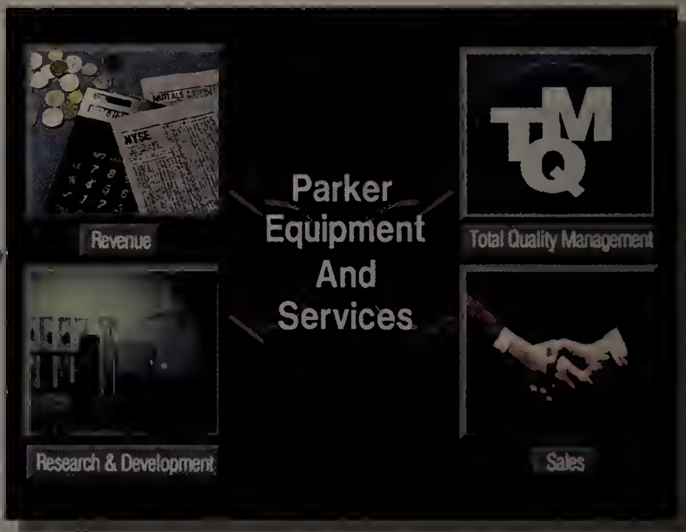

SAS for OS/2 Release 6.08
File Options Windows Help
SAS Tools
Multivariate SASUSER.BUSINESS
Fit SASUSER.BUSINESS
Rotating Plot 1 SASUSER.BUSINESS
EMPLOYS
SALES
PROFITS
12
10
Spline Fit
Parametric Reg

```
         Correlation Matri
           SALES    EMPLOYS
SALES     1.0000    0.7335
EMPLOYS   0.7335    1.0000
PROFITS   0.3082    0.7849
```

```
Parameter     DF      R-Sq
  0.0397    4.277     0.
```

An exclusive MultiVendor Architecture™ is behind the SAS System's strategy for **hardware independence**. Applications run the same way across PCs, workstations, and host systems—making true client/server computing a reality while exploiting the particular strengths of each platform.

Address the needs of users at every level with the SAS System's strategy for **interface versatility**. An EIS interface puts decision makers in command of the facts—when they need them. There's also a task-oriented menu-driven interface for business



The SAS

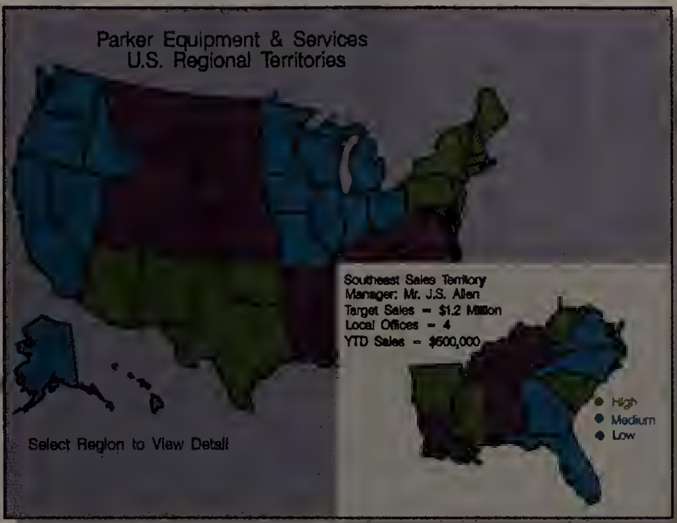
Enterprise Wide In

ion for EIS and Beyond

analysts... plus object-oriented and full-function programming environments for applications developers.

The SAS System's **applications integration** strategy provides one seamless solution for virtually any application that involves accessing, managing, analyzing, or presenting data. Choose integrated tools for decision support, reporting, financial analysis, market research, project management, quality improvement, and more. All backed by SAS Institute Inc., a vital force in the information industry with a strong commitment to helping you succeed—and an unrivaled dedication to training, documentation, technical support, and consulting services.

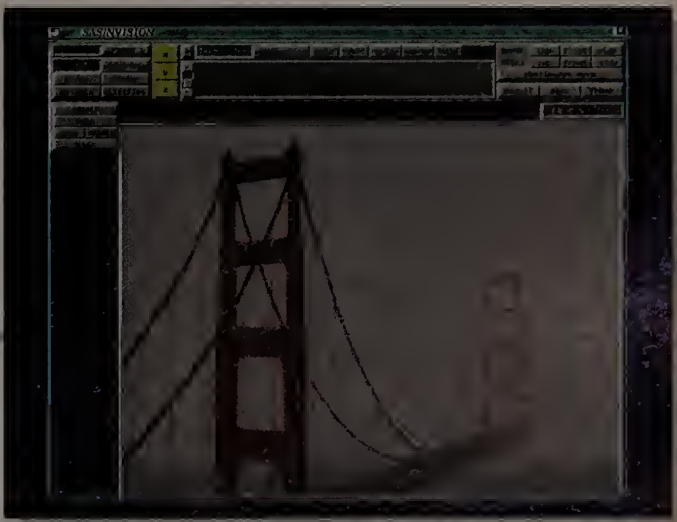
See for yourself how the SAS System of software brings out the best in your hardware and the people who use it. Just give us a call at **919-677-8200** for a free video, plus details about a free software evaluation.

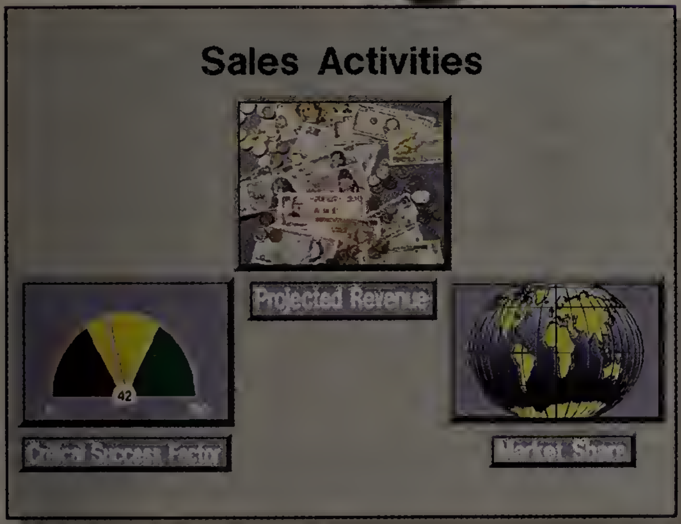


Parker Equipment & Services
U.S. Regional Territories

Southeast Sales Territory
Manager: Mr. J.S. Allen
Target Sales = $1.2 Million
Local Offices = 4
YTD Sales = $500,000

● High
● Medium
● Low
Select Region to View Detail





SAS Institute Inc.
Phone 919-677-8200
Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc.
Copyright ©1993 by SAS Institute Inc.

® System

formation Delivery

Show Us Your Objects

Announcing the 4th Annual

COMPUTERWORLD
Object Application
AWARDS

Think your objects look pretty good?
Then show them off by entering the Computerworld Object Application Awards competition. The winners will be announced in a special awards ceremony on August 16 during Object World San Francisco.

Object-oriented technology is on the cutting edge in the information technology world today and Computerworld wants to put the spotlight on your custom application.

Show us what your objects look like.
Your entry for Computerworld's 1995 Object Application Awards should be an internally developed, custom object-oriented application currently in use (not a prototype) and not for resale. It should be either an entirely new application, a modification of an off-the-shelf application, or an object-based, front-end for a host application.

Then meet Steve Jobs on August 16.
In a special awards ceremony at the Moscone Convention Center in San Francisco, Steve Jobs, Chairman and CEO of NeXT Computer Inc. will present the awards for outstanding application development using object-oriented technology. A reception open to all attendees will follow.

Call today for entry.
To request your official entry kit*, call or fax:

Bill Hoffman
Computerworld Object Application Awards
c/o Object Management Group
492 Old Connecticut Path
Framingham, MA 01701
Telephone: (508) 820-4300
FAX: (508) 820-4303

Deadline for entries is Midnight (EST), May 16, 1995

We're looking for a few good objects.

Sponsored by:

COMPUTERWORLD
The Newspaper of IS

OMG
OBJECT MANAGEMENT GROUP

DISTRIBUTED APPLICATIONS FOR THE REAL WORLD
OBJECT WORLD

* The Computerworld Object Application Awards entry kit contains all details, rules and qualifications for this contest.
Contest is void where prohibited by law. No purchase necessary.

© 1995 Computerworld, 375 Cochituate Road, Framingham, MA 01701 9171, Tel: (508) 879-0700, Fax: (508) 879-0446.

Unlikely Allies

[IS is shedding its traditional image of HR, say Georgia-Pacific's Gwen Barker and Rick Partridge]

Ann States

By Julia King

Information systems are only as good as the people who build them. And lately, the people who build them have had a lot more on their minds than computers.

Corporate downsizing, ongoing business process re-engineering and frequent organizational restructuring are wreaking havoc with IS morale, which at many companies is at an all-time low. Changing technologies, the move to client/server and closer workings with business users are requiring new skill sets. Project demands are high, but worker motivation is low. Job security is all but nonexistent. In many cases, so is trust in IS management.

IS managers are finding that to turn this picture around, they themselves must do an about-face. And they are tapping an unlikely source for help — the corporate human resources organization.

The traditional IS image of HR as a legion of well-meaning but essentially useless bureaucrats seems to be fading. In its place is a growing dependence on HR to help with restructuring and retraining IS staffs and finding new ways to motivate employees and keep them happy and productive.

These HR/IS efforts aim to meet the needs of both individual staff members and the organization. Such efforts include the following:

- Providing one-on-one counseling sessions with IS staffers about their retraining needs and strategies;
- Developing compensation and reward systems and devising more appropriate ways to measure individual performance on teams;
- Establishing training programs to accommodate the transition from centralized to distributed computing.

This contrasts sharply with the picture common just a few years ago, when many IS managers viewed HR as clueless about day-to-day IS operations. On the whole, an us-vs.-them attitude prevailed.

"Traditionally, the IS mind-set has been that human resources is good for policy but doesn't

Unlikely allies, *page 70*

In the past, IS has viewed human resources more as a hindrance than a help. But that image is changing as IS managers become dependent on HR to help retrain and motivate distressed and distrustful staffs.

Unlikely Allies

CONTINUED FROM PAGE 69

really help in meaningful ways," says Gwen Barker, a 20-year IS veteran now an IS human resources consultant at Georgia-Pacific Corp. in Atlanta. "HR is typically viewed as a bureaucratic staff function that creates procedures and then leaves interpretation and implementation up to the operating units."

Gradually, traditional HR organizations are beginning to change, experts say.

"Some companies are waking up to the need for HR to redefine its role," says Charles Savage, president of Knowledge Era Enterprises, Inc., a management consultancy in Wellesley, Mass. Increasingly, HR, like IS, is being integrated into the rest of the business, he says. For instance, several companies have appointed HR liaisons to work with IS departments; others have set up entire HR groups with IS to work exclusively on IS personnel issues.

Georgia-Pacific, Chevron Information Technology Co. in San Ramon, Calif., and Rochester, N.Y.-based Xerox Corp. — long regarded as a corporate organizational innovator — have set up such groups.

Top 12 Human Resource Issues Facing IS Organizations

1. Acquiring a stronger business orientation
2. Encouraging managers to be business-focused
3. Defining skill requirements for the future
4. Emphasizing creativity and innovation
5. Developing a strategy to transfer certain IS functions to users
6. Retraining personnel
7. Providing training in communication and behavioral skills
8. Finding new ways to motivate individual workers
9. Implementing effective change programs
10. Developing better measures of performance
11. Aligning IS organizational structure with IS strategy
12. Developing career path options for technical personnel

Source: 1994 survey of 200 IS human resources managers, Zawacki and Associates, Colorado Springs

General Electric Co. in Fairfield, Conn., and Fireman's Fund Insurance Co. in Novato, Calif., have appointed liaisons from corporate HR departments to work exclusively with decentralized IS professionals.

Thanks to the liaison setup, "it's been a long time since we've been involved in that we-vs.-them attitude toward HR," says Virgil Pittman, Fireman's chief information officer.

That attitude is shared by Steven Edmonson, director of business systems development at the Engineered Materials Division of AlliedSignal, Inc. in Morristown, N.J., which has been in the process of re-engineering since 1992. "We would not have been as successful as we have in the past two years without our HR person," Edmonson says.

Among other things, Edmonson credits the HR liaison with quelling much of the fear and anxiety that accompanies change.

> "There's not a very good relationship between most IS functions and HR. IS people come from a hard-nosed, logical, systematic base of thinking. IS people think HR people come from a softer background. That's kind of a bad starting place."
>
> Jim Webber, President Omnicron Center for Information Technology Management

"This person has a background in psychology and was able to understand a lot more about people than we [in IS] could," he notes. "She was willing to spend time with IS people in stressful situations and help work through things, whether they had been displaced or if they were trying to make a decision about reskilling."

The liaison also helped set up award and recognition programs for IS staffers, something Edmonson says has worked to better focus IS on business issues and to boost morale.

"If a person has done something outstanding that impacts the business, they might receive a monetary award. If a person was recognized by a customer but there was no significant impact on the business, there's a different level of reward," Edmonson says. "HR has helped IS to understand the level of reward that is appropriate."

As companies adopt new client/server, object-oriented and other technologies, retraining IS personnel has become a primary challenge for both HR and IS.

To this end, an increasing number of HR and IS managers are working together to set up competency review programs to determine precisely those areas in which IS staffers may need additional skills or training.

"Three years ago we had a difficult time even putting this topic on [our annual conference] agenda," notes Roger Subkowiac, a partner at People Software Concepts, an IS management and human resources consultancy in New Haven, Conn. But now, he says, about 50 large companies he works with have already implemented or are building competency models to ensure that IS organizations continue to develop their skills around business needs. This can also be good news for IS staffers, who through competency testing and retraining programs are afforded opportunities to keep up their skills and thus increase their employability.

At GE, a large part of the IS training effort is focused on "facilitation, communications and presentation skills," all of which are critical to technical personnel as they are reorganized into business units, said Ron Hancock, manager of human resources and professional development for some 4,500 IS workers dispersed across more than 30 business units.

"I don't like to refer to them as 'soft skills' because some people devalue that," Hancock says. "What we're talking about is the ability to sell your ideas and understand people's positions.The days of IS being technically immersed instead of understanding the total business are pretty much past."

Taken together, the various personnel challenges now facing IS are too much for a technology organization to handle on its own, according to Susan Ulicny, director of corporate systems at Georgia-Pacific. HR support is imperative, she says.

"I couldn't exist without them," Ulicny says of Barker and the other HR staffers who work in the IS organization at Georgia-Pacific. "They are an integral part of our staff." To oversee this new relationship, the company last month appointed its first group manager for information resources/human resources, Rick Partridge.

Among other things, the HR staffers in IS have developed a list of core skills needed in the IS organization and a method for measuring performance against them. This, Ulicny says, has enabled IS to more accurately identify where there are gaps and to tailor training programs accordingly.

Security vs. employability

At Chevron, HR staffers are credited with enabling IS managers to implement an altogether new concept of employability.

"One of the biggest issues we face from a morale standpoint is the lack of job security, and in the past couple of years job security has become a high-priority item for IS employees," says Rose Taylor, general manager of planning and architecture.

With the help of HR, Taylor says, IS employees have training opportunities that allow them to keep their skills current.

Now, for instance, even though Chevron is moving from a mainframe-centric environment to a client/server one, "we still need a lot of mainframe people to maintain legacy systems," Taylor says. As a result, the company can't assign all IS staffers to highly prized client/server projects. "But what we can do is provide educational opportunities [in the form of outside classes or in-house training] so that they'll know those skills ahead of when they are needed," she says.

Another HR initiative at Chevron that has helped dispel job insecurity is a self-nominating process for open IS positions. Under this system, employees recommend themselves for open positions. Final decisions are made by a selection committee whose members are known to the staff.

Previously, "the process wasn't as formalized," Taylor says. "A job would come up, we'd let the supervisor know, and the supervisor would let the employees know." That was the extent of employee involvement, she says.

Now, "there's not this vision that something is happening behind closed doors," Taylor says. "Employees have a good understanding of how a job was filled."

Overall, Taylor likens the role of the HR professional in this process to that of a counselor who coaches IS staffers about their training needs and choices.

Joan Bardez, Chevron's HR manager, views the HR role much the same way. In the absence of job security, "the whole issue of what employees want from a company and what a company's responsibilities are are big issues," Bardez says. "We're trying to move toward a philosophy that we'll do as much as possible to help employees remain employable here or elsewhere."

Seeds Of Satisfaction

Partnerships between IS and HR are resulting in a variety of programs and practices, such as the following:

AlliedSignal, Inc.'s Eng. Materials Div. Morristown, N.J.	● Individual job skills counseling ● New reward and recognition progams
Xerox Corp. Rochester, N.Y.	● Performance-based pay programs
Georgia-Pacific Corp. Atlanta	● Standardized IS job descriptions and performance measurement criteria ● IS staff competency reviews and customized retraining programs
General Electric Co. Fairfield, Conn.	● IS staff training in communication and negotiation skills
Chevron Information Technology Co. San Ramon, Calif.	● Self-nomination of IS employees for vacant positions ● IS employee training in new technologies

Eyes on the prize

At Xerox, which last year outsourced all of the legacy systems to Electronic Data Systems Corp., a key goal of the IS-based recruitment department is to recruit top IS talent to work on state-of-the-art object-oriented systems.

Another goal for that 10-person group, according to Bob Monastero, director of global processes and information management, is "to build a worldwide repository of skills" by training Xerox IS staffers in object-oriented and client/server technologies.

To meet the first goal, the company has established object-oriented technology centers in California, Massachusetts and New York, with a fourth location planned. By giving recruits a choice of geographic locations, Xerox hopes to attract the best and brightest object-oriented professionals, Monastero explained.

Xerox has also begun offering up to 12 days of training annually to the 750 IS employees it retained after outsourcing its legacy systems to EDS. Most staffers, Monastero says, will spend seven or eight days in classes, at an average cost of $10,000 per person. Such training, he notes, improves workers' employability at Xerox and elsewhere.

This is one of the reasons, Monastero says, that Xerox is also interested in developing innovative evaluation and remuneration programs, such as performance-based pay scales. The company views such programs as a way to motivate and retain IS staffers in which it invests, Monastero says.

"One of the risks for us in being at the leading edge is losing people because they change jobs more rapidly," he notes. "If I'm going to make a significant investment in a person, I need to retain them for five years."

Among the incentives he is developing is a retention bonus, separate from other Xerox vesting programs, that would be payable after the employee had worked at the company for five years.

New flexibility

At Georgia-Pacific, Barker says one way to increase retention is by giving staff job flexibility. "The work/family situation is much more important to people than before," she notes. 'Just giving a person a PC at home or a pager helps with this immensely."

Subkowiac says "different companies are ahead in different areas" when it comes to innovative means of recruiting, retraining and retaining IS personnel. Still, he sees a very definite trend emerging: "We've gone from HR support that has been somewhat tentative [in IS] to the point where it is absolutely critical." ■

King is a *Computerworld* senior editor, management.

Intelligence Files

Bank IS spending to grow

Although U.S. bank information and communications technology spending is expected to grow 1.5% annually beyond the $20.1 billion spent in 1994, investments in branch automation actually declined in the past year. That's due to a number of factors, according to "Operating Budgets and Capital Investments for Information & Communications Technology in Banking," a report newly issued by Mentis Corp. in Salisbury, Md.

Investments in branch automation hardware declined from $495 million in 1993 to $454 million in 1994, due in part to an industrywide realization of how complex it is to implement distributed client/server architectures across a banking enterprise, according to Mentis.

Stay home, please!

IS managers are feeling more and more that the best way to increase employees' productivity is to tell them to just stay home. That is the finding of a recent survey by the Olsten Forum for Information Management, a division of the Olsten Corp. in Melville, N.Y. Olsten polled 1,022 corporate, human resources and IS managers on telecommuting.

According to the survey, nearly a third of U.S. companies are encouraging workers to telecommute because they expect this will increase the employee's productivity. An average of 9% of staff telecommute at companies that encourage it; the majority of those employees have delivered on the productivity promise.

Telecommuting is most strongly encouraged at high-technology companies (44%), followed by firms in the services sector (37%), banking/finance (34%), retail/wholesale (33%), insurance (32%), manufacturing (27%), utilities and transportation (22%), health care (20%) and public nonprofit agencies (16%). The study also found that at companies that offer telecommuting, 63% allow it for professional employees, 37% for sales/marketing staff, 30% for financial/accounting staff and 23% for data-entry clerks.

No place like work

While managers would like to see more of their employees work at home, many employees still feel the best place to be on the job is at the workplace.

In a survey by CDB Research & Consulting, Inc., employees from a cross section of industries said they are skeptical about being able to do their jobs as well from home. They cited a lack of equipment, supplies and information access.

Employees also cited a variety of expected advantages of telecommuting, most of them personal in nature. Topping that list were flexibility (57%), setting their own hours (48%), reduced stress (33%), eliminating commuting time (30%) and ability to get more work done (20%). Male respondents favored not having to commute more than female respondents, while female respondents gave a higher rating than men to saving on the cost of child care.

Larry Chiagouris, managing director of CDB Research & Consulting, said, "While we already have the technology to access information from home, through telephone, fax and electronic mail, there appears to be a perceptual gap regarding what these technologies can do."

POSPP gets new name

Mercifully, the 20-year-old Profit-Oriented Systems Planning Program (POSPP), an IS professional association of 70 large companies, has changed its name. Henceforth, the Atlanta-based group will go by the name The Information Management Forum. "It got so we didn't know what POSPP meant anymore, nor did anyone else," said Paul Burdick, an executive at the organization.

ISer is bombing suspect

Edward Leary, 49, an unemployed computer technician, was the prime suspect in the Dec. 21, 1994, bombing of a New York subway car, in which more than 40 persons were injured. Police said Leary, who was fired in January 1994 by Merrill Lynch & Co., was suspected of igniting a mayonnaise jar full of a flammable liquid on a subway car in lower Manhattan. Leary, who suffered burns over 85% of his body, was also being questioned about a similar incident that occurred the week before in which a teenage girl's backpack caught fire on a subway in Harlem.

Customer efforts hailed

Unisys Corp. has honored Signet Banking Corp. in Richmond, Va., with its 1994 Customerize Award for Excellence. The award, which the Blue Bell, Pa., computer maker gives in tribute to customers who support their own clients with "outstanding service programs," recognizes Signet's development of innovative customer service programs.

Call me 439864266

Americans are apparently losing their numbers anxiety when it comes to identification. The latest poll, published Dec.12, 1994, shows that 60% of Americans support the use of a national ID system to curb the hiring of illegal aliens as proposed by a federal commission on immigration reform [CW, Aug. 8, 1994].

The poll, conducted by Louis Harris and Associates, Inc. for Atlanta-based Equifax, Inc., found that whites generally support the plan. Opponents include blacks, people who say they distrust the government and people whose Social Security numbers have been misused.

College earns IS laurels

Cap Gemini America has awarded its first Excellence in Education award to Loyola College in Maryland. The award recognizes the dual focus of Loyola's IS department on business and technology.

BUSINESS, SCHMIZNESS! Give me computers!

Commentary

Madame X

We've heard it over and over: "Be less of a technician and more of a businessperson."

We read about it in magazines and hear endless entreaties at conferences. Although certainly a noble goal, it's one that most computer professionals won't pursue. Why? Because the time and energy it takes to acquire a high level of business skills take us from our prime love, computers. And those of us who have made computing our profession do it for a simple truth that all of us will privately acknowledge but few will dare say: Mr./Ms. Business Colleague, we like computers better than we like you.

We like computing because technology is fun. It's stimulating to try different things and see what happens. And, unlike in most social endeavors, we get immediate gratification. In most other professions you have to wait for results: Salespeople and accountants wait for month-end statistics; executives wait for quarterly results; most managers wait for months or years to know the success of their endeavors. We don't. If a machine is down, we know instantly when it's back up; if we're coding, a compile and a run will tell us if something went wrong.

Most human fun has unpleasant consequences; that's not so with computers. We like computing because machines don't complain. Computers have their problems, but they sit patiently waiting to be fixed. They don't call your boss if it's taking you a while to find a solution. They don't write memos about your poor performance. They don't remind you how often this has happened in the past. They don't blame others for their own mistakes. And they don't make comments like, "I know that's what I said I wanted, but this is what I really need."

Perpetual evolution

How often have you heard, "The computer made a mistake"? Well, we know who's really at fault, don't we? At least if the computer indicates "operator error," it's usually telling the truth. We like computing because there's always something new to learn. We read business magazines because we're obliged to; we read computer magazines for the thrill. We like to see what new and different things have come to the marketplace, things usually created by people just like us trying to solve a problem.

Of course, other fields experience innovation. But most business disciplines deal with people problems, not technical problems. And when it comes to "people problems," there is nothing new under the sun. It's the same old jockeying for power, chasing the buck and dealing with egos that it's always been. In computing, there truly are new problems and new solutions.

We like computing because it brings order and structure. Unlike the real world, which closely resembles chaos most of the time, computing has a fundamental logic that is appealing. It deals with black/white realities: on/off, yes/no, if/then/else. We can break both hardware and software down to their component parts and reassemble them into newer, better shapes. Ask any kid who ever played with Lincoln Logs or an Erector set and you'll know what I mean.

> Unlike the real world, which closely resembles chaos most of the time, computing has a fundamental logic that is appealing.

There are rules, but it is creativity within the overall structure that is so exciting. And sometimes you get to break all the rules and have a true breakthrough.

We like computing because technology makes life better. Computers have removed much of the tedium from life and have certainly been the basis for innumerable advances in medicine, energy, learning and production. Work is more interesting, safer and more egalitarian in many ways because of computers.

Most computer professionals truly believe they have a beneficent craft, capable of advancing human endeavors. That's not to say technology can't be turned to evil purposes — witness stealth bombers, money laundering or pederasts prowling the Internet. In the grand scheme of things, however, the overall effect is one of "better living through technology." And we all contribute to that.

We like computing because it makes us mobile. How many people hate their jobs? How often do you hear computer professionals say that? We have very high job-satisfaction levels because our work is varied. We move from project to project, company to company, industry to industry. We are not tied down to the fortunes of any particular division, firm or market sector. Until you get to the very highest levels in computing, where you've worked is far less important than what you've worked on; it's your experience with appropriate technologies that counts. In this turbulent economy, it is the ultimate job security.

A breed apart

We like computing because it makes us feel special. There is a mystique about computing in the minds of the general public that says you have to be both skilled and smart to work with computers. They know we earn good money, usually more than our contemporaries (given equivalent levels of education and experience). Many companies even have to have separate pay scales for computing folks and the rest of the company. Because of our mobility, we are relatively immune to layoffs and other stresses of modern corporate life. We are part of an elite, and even if businesspeople don't like us, they still need us. We like computing because it is safe. Consider this personal ad: *Wanted: Intelligent, attractive companion who has both playful and serious sides, capable of learning new skills, patient, fun, nonjudgmental, mobile, no bad habits or dependents.*

A few dogs might fit the bill but few humans; almost all PCs would. Computers let us explore encyclopedias of knowledge, engage in far-flung conversations with people we might otherwise never meet and investigate whole new worlds of experience — safely, cheaply and from the comfort of our own home. The rest of the world is now discovering what we have always known, that machines are generally a lot easier to live with than our fellow human beings.

So, businessperson, next time you wonder why we cling so to our discipline, resist working for nontechnologists and feel most comfortable in front of a screen rather than in meetings with you, understand that we really are different and want to stay that way. And yes, if we're smart and ambitious, we'll learn about your business and master your language. But it will always be a second language. The mother tongue is still technology. ■

The author is an IS executive. This column had to be submitted anonymously because people, unlike computers, take offense at the truth.

Calendar

FEB. 26-MARCH 4

SAC '95: 1995 Symposium on Applied Computing. Nashville, Feb. 26-28 — Contact: Jim Hightower, Association for Computing Machinery, Claremont, Calif. (909) 624-8902.

The PC Nightmare Symposium. Orlando, Fla., Feb. 27-March 1 — Topics include upgrades and alterations, disposition, obsolescence, maintaining standardization and assessing costs. Contact: International Computer Negotiations, Inc., Winter Park, Fla. (407) 740-0700.

Effective Methods to Manage and Control a Work Process. Orlando, Fla., Feb. 27-March 2 — Contact: Quality Assurance Institute, Orlando, Fla. (407) 363-1111.

Engineering Document Management Systems Focus '95. Orlando, Fla., Feb. 27-March 2 — Contact: Kalthoff Group, Cincinnati, Ohio (513) 794-3367

Bringing the Power of Teamnets to Your Work. Cambridge, Mass., Feb. 28-March 1 — An interactive workshop led by Jessica Lipnack and Jeffrey Stamps, authors of *The Age of the Network* and *The TeamNet Factor*. Contact: The Networking Institute, Inc., West Newton, Mass. (617) 965-3340.

Marketing on the Internet: An Intensive Briefing on the Keys to Success and the Roads to Ruin. Boston, March 2-3; New York, March 6-7; and Washington, March 9-10 — Fees: Day 1, "The Technology," $495; Day 2, "The Strategy," $695. Contact: Target Marketing of Santa Barbara, Hayward, Calif. (800) 549-4659.

Workflow: Joining the Islands of Automation. Chicago, March 2-3 — Early registration fee is $1,095; regular registration fee is $1,200. Contact: Delphi Consulting Group, Boston, Mass. (617) 247-1025.

MARCH 5-11

The Sixth Annual Expanded International Help Desk Conference. San Francisco, March 5-8 — Seven conference forums examine key issues, including planning, implementing and supporting a help desk or related support service. Contact: Help Desk Institute, Colorado Springs, Colo. (719) 531-5138.

The Workgroup Solutions Conference and Expo. Boston, March 5-8 — A guided tour of groupware, including improved electronic meeting facilitation techniques; maximizing return on investment; global collaboration; groupware for heterogeneous architectures; automating field personnel; developing workflow applications; integrating groupware with legacy systems; and administration and security issues. Contact: David Coleman, GroupWare '95, San Francisco, Calif. (415) 282-9192.

Convex User Group Worldwide Conference. Dallas, March 5-9 — Contact: Mary Kay Havens, Convex Computer Corp., Richardson, Texas (214) 497-4584.

Information Security Managers Symposium XIV. San Diego, March 7-9 — Contact: MIS Training Institute, Framingham, Mass. (508) 879-7999.

MARCH 12-18

15th Annual Use of Clinical Information Systems Conference. Snowbird, Utah, March 12-15 — Contact: Association for Applied Clinical Information Systems, Ann Arbor, Mich. (313) 971-6557.

Announcing the First Annual Apple Enterprise Awards
Call 1-800-396-6877 for an entry kit

Call for Entries

Apple Computer has always been committed to providing people with power. The power to be your best.™ That is why Apple, in association with *Computerworld,* will pay tribute to developers whose ideas and software have helped others perform at their very best.

Developers like you, for instance.

Because of your work, companies and institutions have increased efficiency and productivity. They have been able to accomplish things that were never possible before. And we feel it is high time your accomplishments were recognized by an award of your very own. Therefore, it's our pleasure to announce the first annual Apple Enterprise Awards.℠

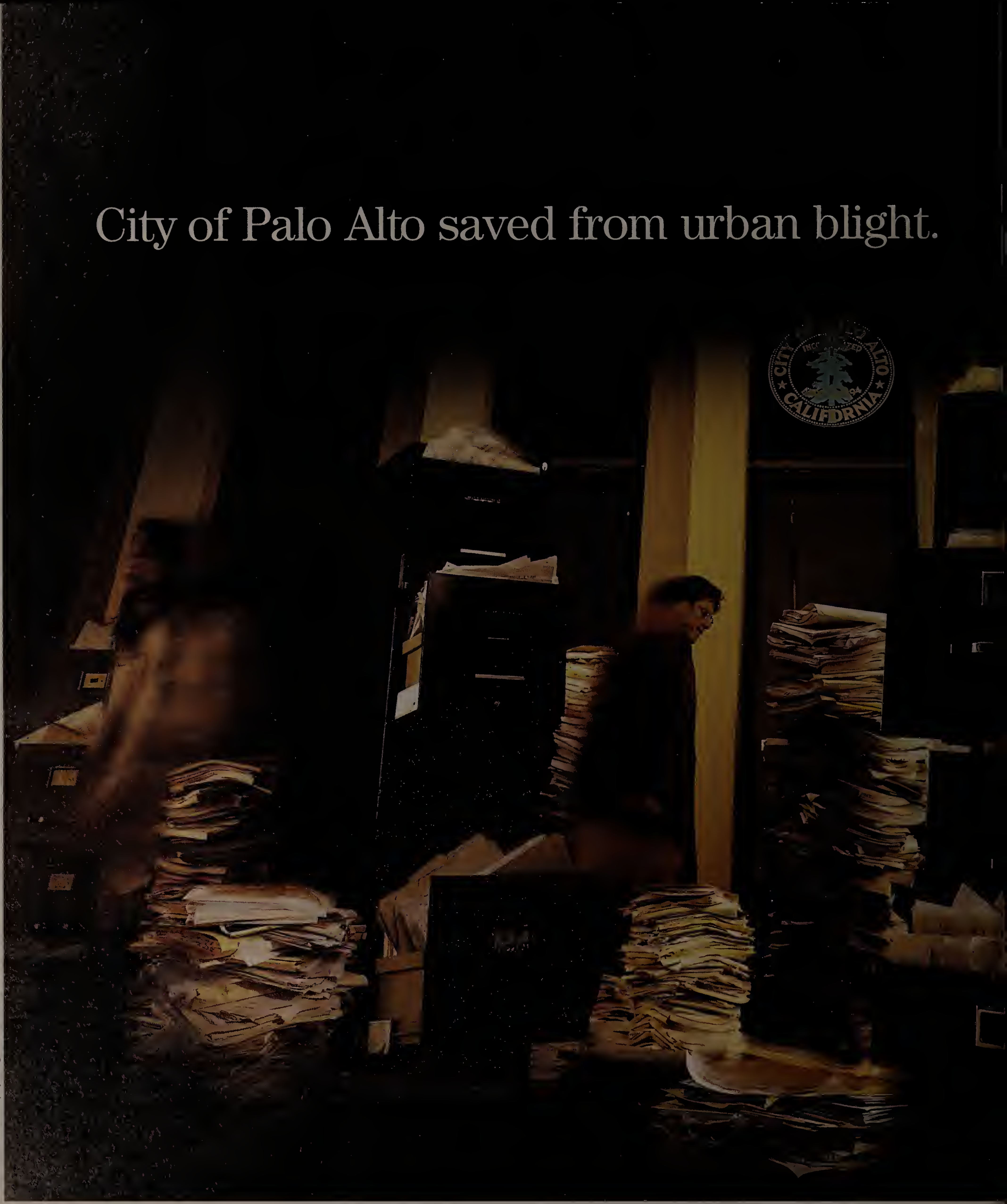
The Apple Enterprise Awards is a global competition designed to honor developers of innovative custom solutions that best employ Apple® technologies. Your submission will be judged on how you've delivered an effective custom solution in your organization.

Winners will be announced at an awards ceremony during PC Expo in New York, June 19-22, 1995. Winning solutions will be displayed in the Apple Enterprise Awards booth at the show, and featured in a special supplement in *Computerworld.*

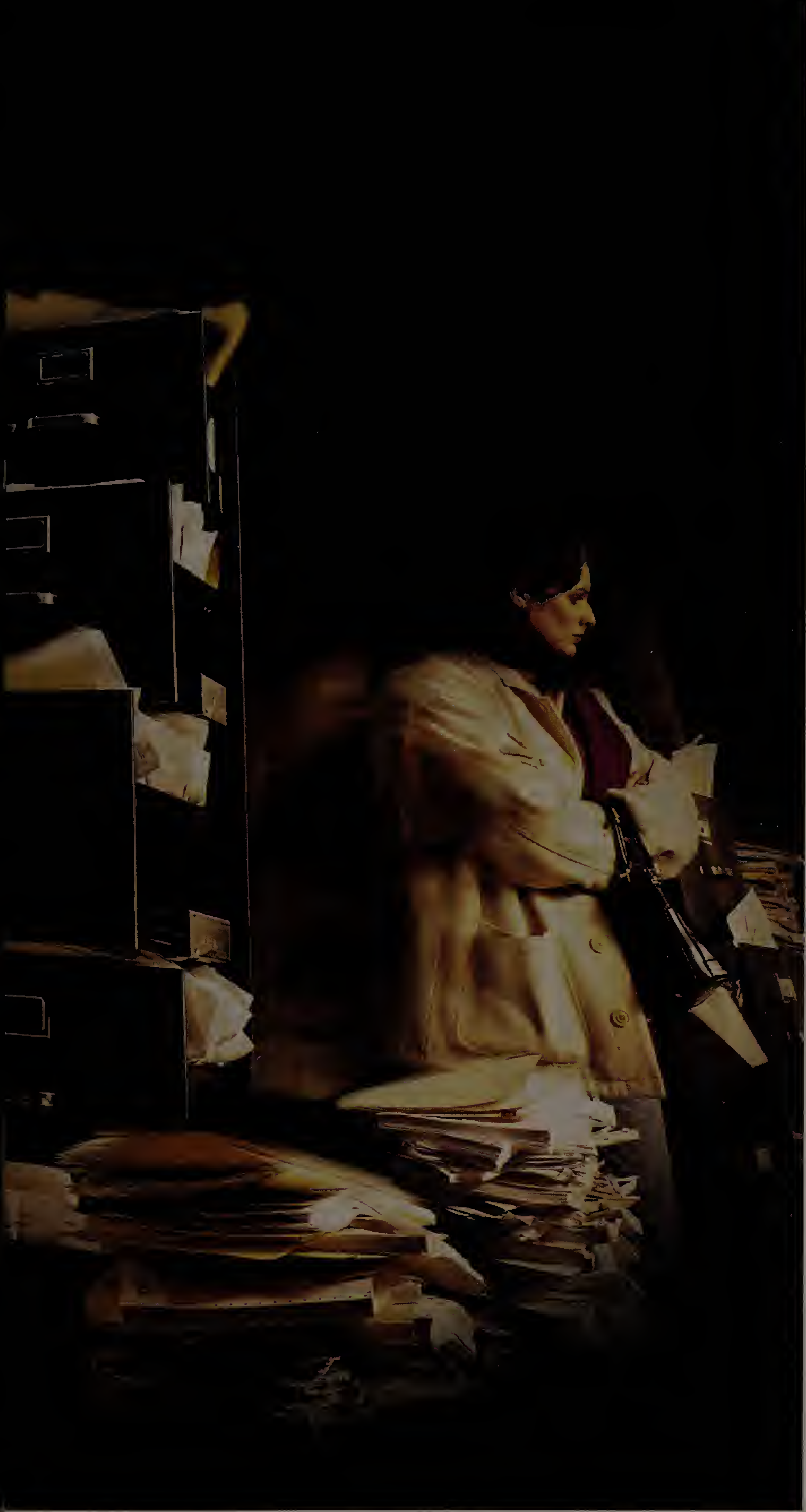
So call 1-800-396-6877 today to receive your entry kit. The deadline for entries is **April 3, 1995**. Hurry, because it's not every day that you get a chance to be recognized.

Apple Enterprise Awards
Computerworld's Corporate Application Contest

The official entry kit contains all details and rules for this contest. Void where prohibited by law. No purchase [illegible] Computerworld, Inc. is an IDG company. © 1995 Apple Computer, Inc. All rights reserved. Apple, the Apple logo and "The power to be your best" are registered trademarks of Apple Computer, Inc. Apple Enterprise Awards is a service mark of Apple Computer, Inc.


City of Palo Alto saved from urban blight.

© 1995 Hewlett-Packard Company. All rights reserved. ISG 1



HP SureStore Optical Jukebox gets 48 cabinets of files onto the network and off the floor.

It was not a pretty sight. More than 900 square feet of office space, buried in paper documents. Police records. Building inspection reports. Tens of thousands of files. And with the growing demand for information—and the mounting costs of finding misplaced records—a bad situation was fast becoming a crisis.

HP SureStore

Hewlett-Packard had the long-range solution the city desperately needed. An optical jukebox that could safely store every last file onto the network. Since HP optical disks have a 30-year shelf life, the city's records would last far longer than they ever could on paper. And there'd be no danger of running out of storage space. HP optical disks can be removed and swapped—so storage capacity is virtually limitless.

Today archived documents that took city workers days to unearth can now be accessed with a simple touch of a key. And the savings are substantial. Between increased productivity and reduced overtime, the City of Palo Alto figures their HP SureStore Optical Jukebox saves them about $26,000 annually. And frees up $31,000 worth of rented office space to boot.

Are burgeoning archives a blight on *your* operations? HP has the proven solution. For more information, call **1-800-826-4111, extension 9106.**

HEWLETT®
PACKARD

Who Delivers RAID Storage For The Long Haul?

Ask PC Week.

"...most impressed by the SuperFlex's performance, expandability, and myriad configuration possibilities."

"Storage Dimensions' RAID subsystem outperforms Compaq Smart Array."

"...SuperFlex offers investment protection that should help [CFOs] rest easier."

"Hardware vendors focus little on making their products backward-compatible. The result: Chief financial officers wind up amortizing equipment over five years, even though it's likely rendered extinct in two."

That's how PC Week described the industry in an October 17, 1994 article on storage products. It found one bright spot, however: SuperFlex™ from Storage Dimensions.

Bucking the trend.

After an in-depth review, PC Week concluded that the SuperFlex RAID system "bucks the trend toward accelerated obsolescence." The review specifically praised SuperFlex for its investment protection through:

- Modular design to incorporate future technologies
- Simple field configurability and upgradability
- Easy expandability for growing requirements
- Backward (and forward) compatibility of hardware

Superior performance.

What about performance? PC Week Labs benchmarked SuperFlex and Compaq's Smart Array. The result? In I/Os processed, SuperFlex outperformed Smart Array 2 to 1.

SuperFlex uses high-performance, high-reliability Barracuda drives from Seagate.

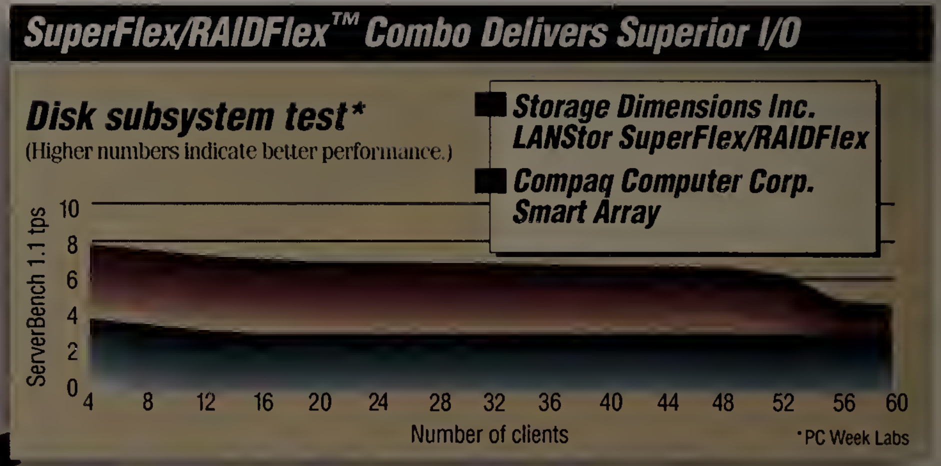
STORAGE BY SEAGATE

Non-stop operation.

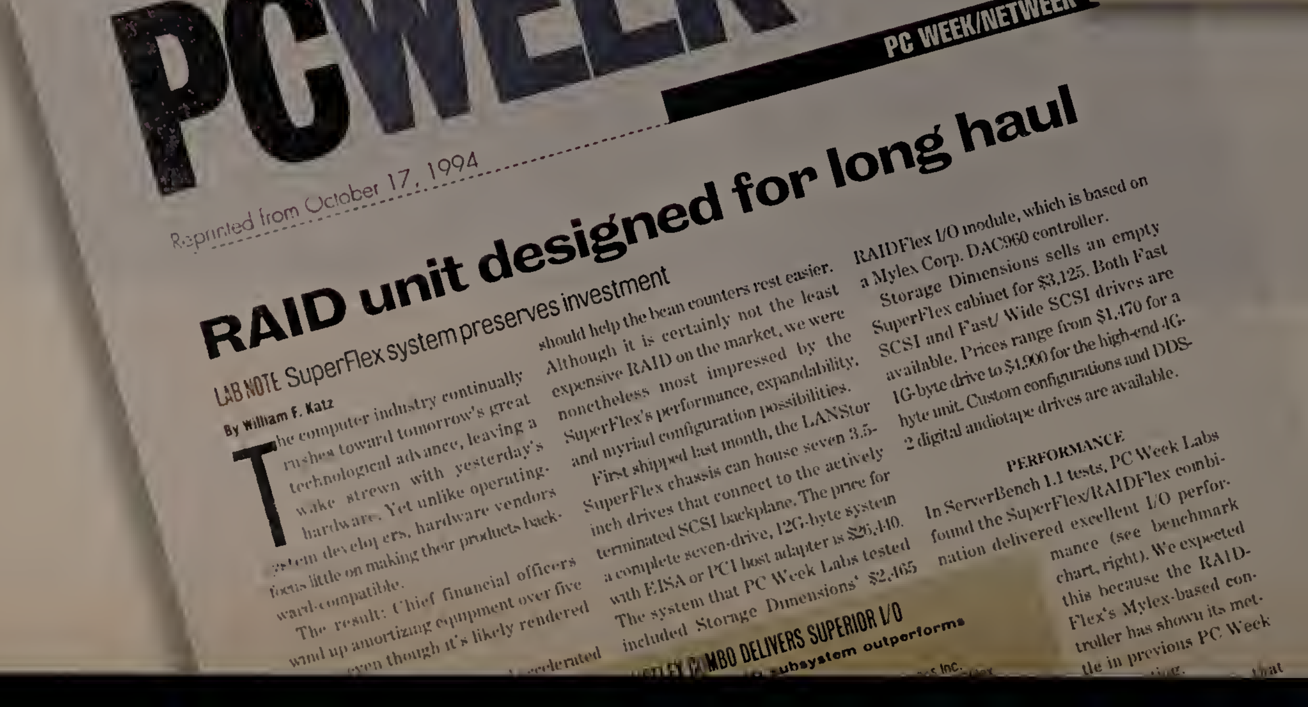
PC Week also praised the high reliability of the SuperFlex design. With hot-swappable, redundant power supplies, triple fans, on-line spares, and a sophisticated cableless backplane, SuperFlex truly is the "RAID unit designed for the long haul."

To get the complete story, call us. We'll send you a reprint of the article along with more information about SuperFlex – the innovative, Enterprise Storage Platform™. Let us help you *buck the trend!*

SuperFlex/RAIDFlex™ Combo Delivers Superior I/O



*PC Week Labs


PCWEEK
PC WEEK/NETWEEK

Reprinted from October 17, 1994

RAID unit designed for long haul

LAB NOTE SuperFlex system preserves investment

By William F. Katz

The computer industry continually rushes toward tomorrow's great technological advance, leaving a wake strewn with yesterday's hardware. Yet unlike operating-system developers, hardware vendors focus little on making their products backward-compatible.

The result: Chief financial officers wind up amortizing equipment over five years, even though it's likely rendered

should help the bean counters rest easier. Although it is certainly not the least expensive RAID on the market, we were nonetheless most impressed by the SuperFlex's performance, expandability, and myriad configuration possibilities.

First shipped last month, the LANStor SuperFlex chassis can house seven 3.5-inch drives that connect to the actively terminated SCSI backplane. The price for a complete seven-drive, 12G-byte system with EISA or PCI host adapter is $26,440. The system that PC Week Labs tested included Storage Dimensions' $2,465 RAIDFlex I/O module, which is based on a Mylex Corp. DAC960 controller.

Storage Dimensions sells an empty SuperFlex cabinet for $3,125. Both Fast SCSI and Fast/ Wide SCSI drives are available. Prices range from $1,470 for a 1G-byte drive to $1,900 for the high-end 4G-byte unit. Custom configurations and DDS-2 digital audiotape drives are available.

PERFORMANCE

In ServerBench 1.1 tests, PC Week Labs found the SuperFlex/RAIDFlex combination delivered excellent I/O performance (see benchmark chart, right). We expected this because the RAIDFlex's Mylex-based controller has shown its mettle in previous PC Week

MBO DELIVERS SUPERIOR I/O

subsystem outperforms

Call 1-800-765-7895 Ext. 120

STORAGE DIMENSIONS

Storage Dimensions is located at 1656 McCarthy Blvd., Milpitas, CA 95035.
© 1994 Storage Dimensions. SuperFlex, RAIDFlex, and Enterprise Storage Platform are trademarks of Storage Dimensions. All other brand or product names are trademarks or registered trademarks of their respective owners.

The CW Guide to RAID Storage Devices

RAID *goes* RADICAL

INSIDE

page **78** **LET'S MAKE A DEAL:** Users talks about the priorities (and discounting) that led them to purchase one of the Top 3 large system RAID storage products.

pages **80** **82** **BATTLE ENGAGED:** Now that StorageTek and IBM have entered the fray, EMC has a new fight on its hands. Buyers' Satisfaction Scorecard and Firing Line evaluators provide some hype-free analysis from the trenches.

page **83** **MIDRANGE MADNESS:** Even the staid AS/400 and other midrange arenas are going wild over RAID. But it's taking an open systems twist.

The growing popularity of RAID is turning the storage market upside down — even for mainframe sites. Traditional direct-access storage device (DASD) farms, where general-purpose devices meet all manner of requirements, are giving way to RAID systems with unique architectures designed to match the specific data-access and storage needs of each site.

Three major vendors are jockeying for position in this new data-driven world. EMC Corp. opened the RAID market with its Symmetrix systems, which use large amounts of cache and software systems to boost performance. The company has taken more than a little business away from IBM, which once owned the DASD market. EMC has also grown at the expense of Storage Technology Corp., which has dragged its feet in delivering its own RAID technology.

Now, IBM's Ramac and StorageTek's Iceberg are being delivered to mainframe sites. These products are creating more choices for information systems managers and reshaping the storage landscape. In this report, Robert Callery, an analyst at International Data Corp. (IDC) in Framingham, Mass., describes how the changes affect your buying decisions. Users of each of the three products explain what led them to choose a particular product. Our Buyers' Satisfaction Scorecard and Firing Line spotlight the views of 119 storage users at large mainframe sites.

This Guide also looks at the midrange storage market, which is rapidly evolving from a proprietary model to an open systems, RAID-heavy structure. Lab tests highlight the challengers in the IBM AS/400 arena, and a roundup chart lists the leading products across the board.

Take note of the radical remaking of this segment of the computer business. It will make your choices for storage harder but provide solutions that better fit your site's unique requirements.

BUYING ISSUES

In the RAID world, products are built to fit the data. In the past, IBM offered one-size DASD for all needs.

By Robert Callery

Like a tidal wave of change, RAID is sweeping over the large systems storage marketplace and brushing IBM's traditional DASD dominance aside in the process.

In a few short years, Hopkinton, Mass.-based EMC has risen from the fringe of the data center to become IBM's leading challenger for market share. It has done so on the strength of its RAID-like approach to DASD, offering high performance and availability at an affordable price.

Last year, IBM finally answered the challenge with its own RAID system, known as Ramac. StorageTek in Louisville, Colo., also finally delivered its long-delayed Iceberg RAID device.

IBM's and StorageTek's systems offer complete RAID compliance, including Level 1 through Level 5. (See RAID definitions at left.) EMC's Symmetrix line, although identified in the RAID category, currently offers only a disk mirroring option as its main RAID component.

These new devices provide dramatically improved performance, reliability and functionality over IBM's traditional DASD. They also provide a radical change in the way storage devices are designed and purchased.

Always charged with keeping corporate data safe, available and quickly accessible, IS managers had a much simpler decision to make as little as three years ago. The only significant issue was determining which vendor to do business with. All suppliers offered similar technology. Some subsystems offered better environmentals and performance, but user alternatives were somewhat limited.

But today RAID suppliers are building storage strategies around completely different architectures and designs and are attempting to solve I/O problems with a variety of approaches.

Data first

A short while ago, vendors offered a "one-subsystem-fits-all" solution to businesses. IBM, just one disk generation ago, provided users with a generic family of storage products, the 3390-3 series, which offered one basic level of performance, capacity and fault tolerance in the mainframe environment.

New entrants in the market, such as EMC and StorageTek, began to offer storage solutions revolving around customer data requirements. With IBM following suit, this led to a Copernican revolution in the storage world. However, the focus is now shifting to the data itself instead of on the subsystem that stores data. The characteristics of the data largely dictate the type of disk hardware required

AT PRESS TIME

EMC confirmed last week that it plans to deliver RAID-S, a new version of its Symmetrix line in the third quarter. RAID-S will feature RAID 4-plus capabilities. The typical configuration for the system will feature three data disks to one parity disk, with up to 128 disks suppported in total. The RAID-S logic will be embedded in a new chip in the Head Disk Assembly. The product will also support multiple RAID levels and data formats in a single system, sources said. See related story in news.

The EMC product will be delivered in the same time frame as HDS's first RAID 5 offering. HDS will reveal its plans on Feb. 7. StorageTek is also expected to discuss its next RAID product, called Kodiak, in a Feb. 7 announcement.

RAID DEFINED:

RAID stands for redundant array of independent disks. In the mainframe environment, it represents a set of physical disk drives that the operating system views as a single logical drive with data distributed across it. Redundant disk capacity is used to store parity information to guarantee data recoverability in case of a disk failure. RAID was developed and patented by IBM in the mid-1970s.

RAID is divided into five levels. The three most common are:

RAID 1: Data mirroring
- This provides complete fault tolerance. Data can be recovered if a disk fails because two copies are kept.
- The disadvantage is that only half the available space is used for data storage; the rest is for backup. This doubles the cost per megabyte.

RAID 3: Data striping
- This involves spreading the data across multiple disks in the array, with one used for parity.
- The main advantage is fault tolerance. The data can be recovered if any disk fails. Performance is excellent because there is a high transfer rate for large sequential files.
- While strong in fault tolerance, this level has a disadvantage — if more than one drive fails, you're in trouble.

RAID 5: Data striping plus
- Data and parity are spread across multiple disks in the array.
- Fault tolerance is strong as well as performance.
- Unlike RAID 3, distributed parity decreases the risk of lost data from a single drive failure, but it increases performance penalties for write functions.

Source: International Data Corp., Framingham, Mass.

Why I bought this RAID

By Ron Levine

Levine is a freelance writer in Carpinteria, Calif.

MARKET PRESENCE, SIZE AND PERFORMANCE

USER PROFILE

High capacity and high performance are the leading strengths of the Symmetrix 5500 series introduced in December 1992

When TDS Computing Services, Inc. in Madison, Wis., decided to replace its 3380 storage devices with a new storage system, its dilemma wasn't which RAID system to choose but whether to go with RAID or IBM's 3390.

"The economies of scale and performance pointed to RAID over traditional DASD," says Gary Annen, manager of technology integration services. "Our selection criteria included price, the length of time the vendor had been in the market, availability of software/hardware support and reliability."

TDS, which provides data processing support for the corporation's three main business units — United States Cellular, TDS Telecom and American Paging — opted for EMC's Symmetrix RAID Level 1 system. "We never considered other RAID units as we didn't need their capabilities," Annen says.

The RAID storage units are used for all TDS mainframe applications. RAID Level 1 — disk mirroring — performance provides the needed reliability at the best price. The company uses two Symmetrix 4800 Model 32s (90G bytes of storage and 1.2G bytes of cache), and one 5500 Model 9, running 9G-byte high-density disks (with a maximum capacity of 1T byte of cached disk storage).

Symmetrix's dynamic sparing and mirroring features have already proved to be effective, Annen says.

TURNED UPSIDE DOWN

and what type of storage device the data resides on.

With this different way of viewing data comes a new way of evaluating storage devices. The main technology choice users are making is between performance and fault tolerance. To date, no vendor has a legitimate claim as champion in both areas. (See Buyers' Satisfaction Scorecard and Firing Line, pages 80 and 82, respectively.)

In the short term, a mixed hardware/vendor strategy continues to be the most prudent one for storage acquisitions. Each vendor offers unique performance and reliability characteristics that satisfy data requirements.

Pricing advantage

By maintaining a multiple-vendor procurement plan, customers will continue to have maximum leverage to obtain the best possible pricing.

Another challenge for users will be determining whether they should buy new products from other vendors. Amdahl Corp. and Hitachi Data Systems Corp. are poised to bring high-performance, high-availability RAID 5 products to market in 1995.

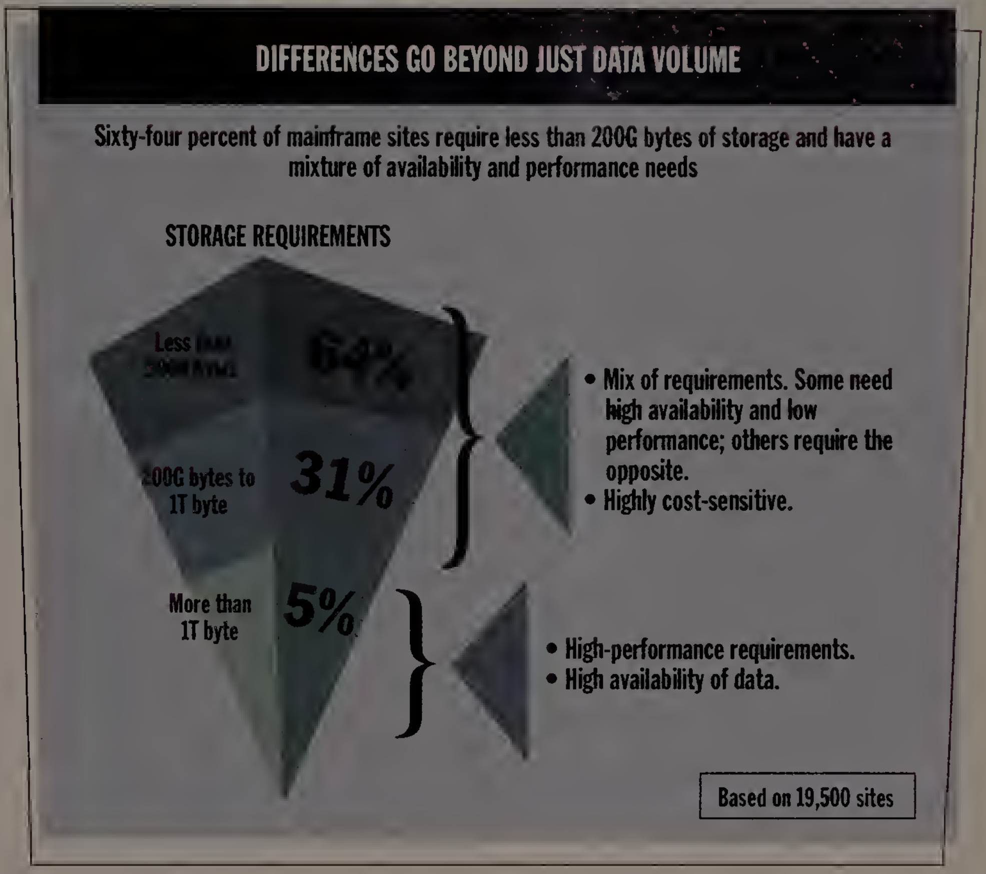
With both suppliers introducing products based on 3½-in. disks, there will be similarities in product characteristics such as redundant componentry like fans and power supplies and environmental savings like power and cooling requirements.

These will be dramatic improvements over the capabilities of existing products. While HDS hesitates to go public with details on its expected 1H95 storage announcement, IDC expects the company to introduce a RAID 5 subsystem that is based on 3½-in. disks and offers subsystem capacities close to 1T byte of storage.

Along with its fault-tolerant characteristics, IDC expects the HDS Scalable Server to offer hot pluggable disks and built-in hot sparing.

In the first half of 1995, IDC expects Amdahl to announce a storage product that will operate in MVS and open Unix environments. The product is code-named Warp 9 and will offer multiple us-

Buying issues, *page 84*



Source: Vendor estimates

[illegible]

AVAILABILITY, PERFORMANCE AND A GOOD DEAL

USER PROFILE Availability, performance and price compelled Alamo Rent A Car, Inc. in Fort Lauderdale, Fla., to select StorageTek's Iceberg subsystem.

Announced in January 1992, Iceberg finally began shipping last year. While it is designed to reduce RAID 5 performance penalties, Iceberg's key attributes are high capacity and high availability.

But the race was close, says Tom Loane, vice president of computer and communications services at Alamo. IBM's Ramac and Iceberg systems are similar in many aspects, Loane says. "It just happened that StorageTek had the best deal the week we went shopping."

Loane also looked at EMC's Symmetrix. "EMC also has a good product, but it does not perform in our environment. Our use is write-intensive, and we felt it was not right for us," he says.

Alamo considered traditional DASD before it selected the RAID system. But the economics were 100% on the RAID side; it's a lot cheaper than conventional DASD, Loane says.

"Once you invest in the software to make RAID 5 work, the disks are cheap. It's also nice to have a box that is an order of magnitude smaller than what it's replacing, thus saving floor space and requiring less air conditioning," he says.

The Iceberg storage system at Alamo is configured for 200G bytes of storage with 512M bytes of memory.

IBM

COMPATIBILITY AT THE RIGHT PRICE

USER PROFILE Compatibility was PMI Food Equipment Group's No. 1 concern in its search for a RAID product last year.

Announced in June 1994, Ramac finally gave IBM a toehold in the large system RAID market

"Whatever we purchased had to use our existing files without modification, handle our database tasks, provide the response times we required, have high-availability and equal the present total capacity, plus give us some room to grow. Ramac fit the bill," says Ray Florence, director of PMI's Corporate Data Center in Troy, Ohio.

PMI, a manufacturer of restaurant food processing equipment, replaced two 3390 Model 3s, one 3390 Model 9 and an older 3380.

The firm wanted something that could use the existing controllers and the 3390 data structures as is and was compatible with its IBM ES/900 mainframe system. Cost was important, but compatibility was the main issue.

These requirements led PMI to choose IBM's RAID product, Ramac, last October. The installation went smoothly and without any problems, Florence says. "It's great to have just one little box sitting there humming, replacing a string of big heavy ones," he says. "We looked at StorageTek's and EMC's offerings but were concerned about the controller issue and selected IBM. They gave us the best deal with compatibility and cost."

The installed Ramac configuration is a 3392 B13 with 13 drawers. The system can be expanded to 16 drawers, with a capacity of 90.8G bytes of storage.

BUYERS' SATISFACTION SCORECARD:
RAID heavyweights duke it out

BY KEVIN BURDEN

ON ICEBERG:

"With an Iceberg running the way it's designed to run, it should be fully fault tolerant and you should never suffer a failure," says Bob Callery, research manager for storage and peripherals at International Data Corp. in Framingham, Mass.

ON SYMMETRIX:

"It's not as fault tolerant as Iceberg, but because the software constantly monitors the system, Symmetrix automatically fixes itself before data is lost," says Dick Wilmot, editor of the "Independent RAID Report" in Lafayette, Calif.

The Super Bowl may be over, but the battle for market dominance in high-end RAID still rages. Will the winner be first-to-market EMC Corp., with its established Symmetrix line? Or will it be the company no one dares call an underdog, Storage Technology Corp., with its long-awaited Iceberg?

And can IBM regain its dominance in data center storage with its newly delivered Ramac large systems RAID storage device?

According to International Data Corp. (IDC) in Framingham, Mass., EMC and IBM will each ship almost 34% of the total terabytes of mainframe storage this year, compared with just 10% for StorageTek. But most important, this market now has more than one contender.

Computerworld's user evaluations indicate that each product has an edge in certain areas. Symmetrix tops the performance ratings, while Iceberg and Ramac share the lead in reliability. A user analysis of Iceberg and Symmetrix follows. For the story on Ramac, see Firing Line (page 82).

Iceberg

The Iceberg 9200 Disk Array Subsystem has been the most anticipated storage product ever released. StorageTek did a lot to help build the hoopla by teasing the market, announcing one release date after another. However, as the product's user satisfaction scores show, Iceberg may have been worth the wait.

Iceberg's highest score was awarded for recovery from failures. It is a true RAID 5+ implementation, which means parity data is spread across all drives in the array, allowing Iceberg to take a hit on any two disks and still reconstruct the data.

Beyond RAID 5, Iceberg provides full fault tolerance at all levels of the system, including power, fans, cache memory, controllers and disk drives. "With an Iceberg running the way it's designed to run, it should be fully fault tolerant, and you should never suffer a failure," says Bob Callery, research manager for storage and peripherals at IDC.

Iceberg's major liability is its poor rating for ease of use. The system is very complex, says Paul Wolfstaetter, an analyst at Gartner Group, Inc. in Stamford, Conn. "You don't install an Iceberg unless you send your people to [StorageTek's] school in Colorado for a couple [of] weeks."

Iceberg's scaling flexibility helped it receive a high grade for capacity. Users can add 50G-byte upgrades to the 100G-byte base capacity, up to the full capacity of 400G bytes, before they need to purchase a new frame and controller.

Iceberg has also reduced the RAID 5 write penalty associated with locating and updating files in the same physical location. Iceberg employs a concept called the log-structured file system that rewrites the data in available free space elsewhere, then purges the old file.

While this reduces the write penalty, there is a potential trade-off in performance. As the in-use capacity of an Iceberg subsystem grows, its ability to quickly locate available space decreases, according to Callery. "When the [in-use] capacity gets up above 85%, the system spends too much time trying to collect free space, and that can affect its performance," he says.

Iceberg's speed, however, received favorable ratings, which indicates that users are either keeping the use below the 85% in-use threshold or carefully managing its capacity.

Part of what makes Iceberg different from its competition is its virtual direct-access storage devices (DASD). Conventional DASD requires spaces between written data so the read/write mechanism can work. Iceberg uses compression technology on the front end, which eliminates the need for gaps.

"The compressed data means that you get more data stored per gigabyte, and because you're sending compressed data down the channel, it can actually improve its performance," Callery explains.

Symmetrix

The Symmetrix series, while not considered true RAID technology, employs a mirroring technology similar to RAID 1 that creates a copy of all its stored data. But unlike Iceberg's fully fault-tolerant setup, Symmetrix depends on intelligent software to detect potential failures and move threatened data to spare disks before it becomes a problem.

"It's not as fault tolerant as Iceberg, but because the software constantly monitors the system, Symmetrix automatically fixes itself before data is lost," says Dick Wilmot, editor of the "Independent Raid Report" in Lafayette, Calif.

Its intelligent software also contributes to its ease of use. "Symmetrix takes over a lot of the control. You don't have to do any cache tuning or issue any commands. You just turn it on, and it does most of it for you," says Tom Miller, a senior technical analyst at St. John's Hospital and Medical Center in Detroit.

Symmetrix's total possible capacity is an ample 360G bytes. But its rating indicates that users are less than completely satisfied, which could be due to mirroring. Because every piece of data is written twice, one can store only half that amount, Wilmot explains.

Possibly bringing down the capacity score further is Symmetrix's method of expansion. Unlike Iceberg's more granular upgrade, where additional units are wheeled and plugged in for every added 100G bytes, Symmetrix's upgrade is not as easy.

"You have to add more [Head Disk Assembly] and other internal components," Callery says.

But what makes Symmetrix so unique is its brute force method of including a lot of resources to solve I/O problems. For example, Iceberg increased its maximum cache to 1G byte, but it still has only one quarter of what Symmetrix contains.

Data stored in the cache can be retrieved much faster than DASD data. Users can write data to cache or rely on Symmetrix's intelligence to detect highly active data and place it in cache. ■

Burden is *Computerworld*'s senior researcher, Firing Line/Scorecard.

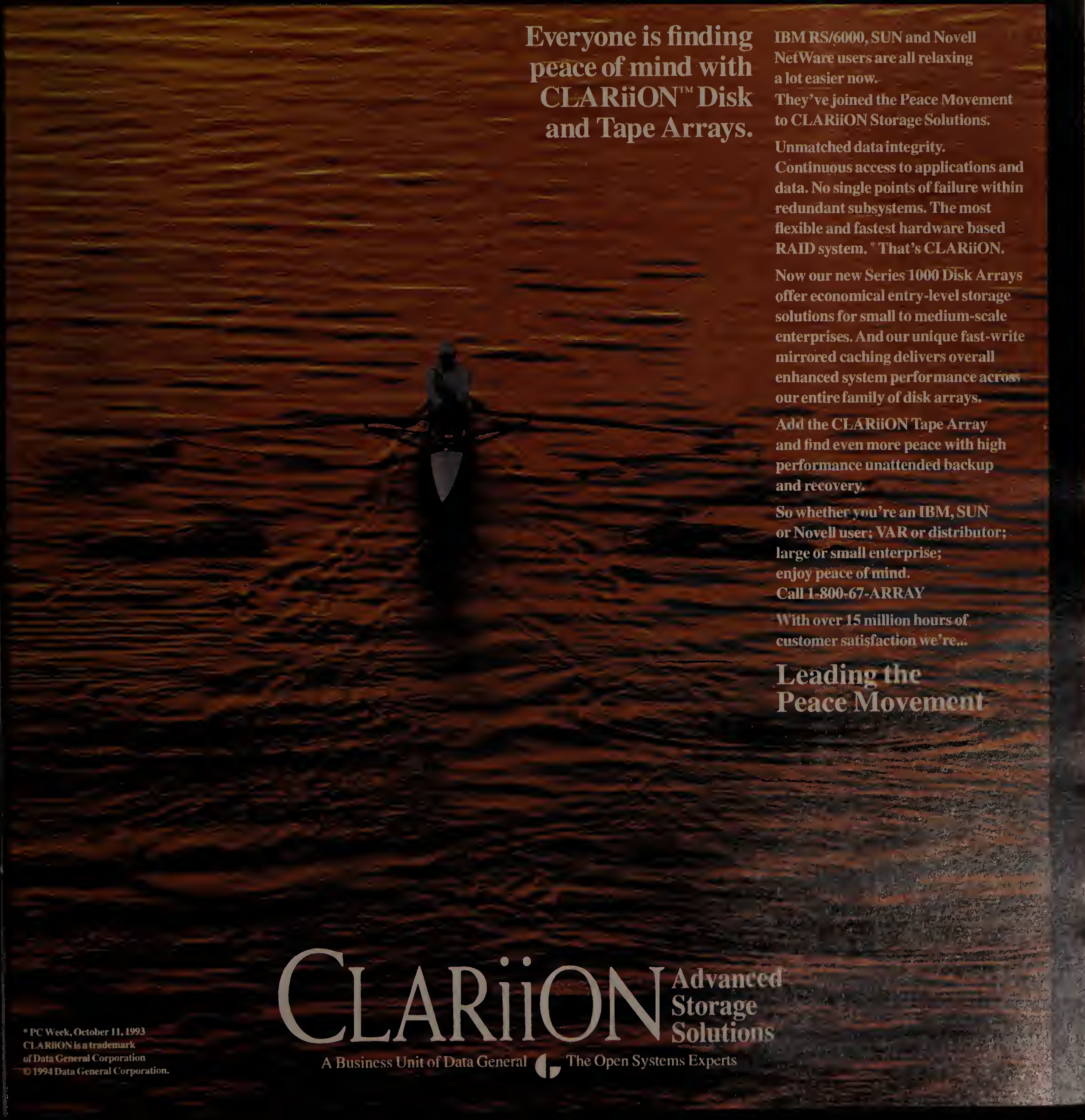
USER RATINGS: AN ALMOST EVEN SPLIT

Ratings are based on a 1-to-10 scale, where 10 is best. Total score is the average of ratings weighted by the category's importance to that vendor's users. Categories are listed in order of importance to all users.

	EMC Symmetrix* *BASE: 38 users*	StorageTek Iceberg (9200) *BASE: 32 users*
TOTAL SCORE	7.1	7.4
RECOVERY FROM FAILURES	8.0	9.4
EASE OF USE	7.1	6.8
CAPACITY	6.3	7.2
SPEED	7.8	7.2
COST	6.2	6.6

** Includes a variety of models. Sixty-eight percent of the users rated 5500 class systems.*

For IBM, SUN and Novell users CLARiiON is leading the Peace Movement.



Everyone is finding peace of mind with CLARiiON™ Disk and Tape Arrays.

IBM RS/6000, SUN and Novell NetWare users are all relaxing a lot easier now.

They've joined the Peace Movement to CLARiiON Storage Solutions.

Unmatched data integrity. Continuous access to applications and data. No single points of failure within redundant subsystems. The most flexible and fastest hardware based RAID system.* That's CLARiiON.

Now our new Series 1000 Disk Arrays offer economical entry-level storage solutions for small to medium-scale enterprises. And our unique fast-write mirrored caching delivers overall enhanced system performance across our entire family of disk arrays.

Add the CLARiiON Tape Array and find even more peace with high performance unattended backup and recovery.

So whether you're an IBM, SUN
or Novell user; VAR or distributor;
large or small enterprise;
enjoy peace of mind.
Call 1-800-67-ARRAY

With over 15 million hours of customer satisfaction we're...

Leading the Peace Movement

CLARiiON Advanced Storage Solutions

A Business Unit of Data General The Open Systems Experts

* PC Week, October 11, 1993
CLARiiON is a trademark of Data General Corporation
© 1994 Data General Corporation.

FIRING LINE:

Ramac, designed for compatibility

BY KEVIN BURDEN

One of the first things you notice about IBM's Ramac is that the company's first entry into large system RAID emphasizes compatibility. That's both a blessing and a curse.

Ramac saves users money by working with IBM's 3990 controllers, but it also ties performance to the previous generation of technology. The controllers were designed for IBM's 3390 direct-access storage device (DASD) products.

"We looked at EMC and StorageTek, but in the final analysis it came down to cost," says Raymond L. Florence, corporate data center director at PMI Food Equipment Group in Troy, Ohio.

Despite the legacy controller, Ramac provides much enhanced performance over 3390 DASD, evaluators for this Firing Line reported. But it also requires twice the initial load times cited by IBM.

Evaluators included a financial services firm, a manufacturer, a health care provider and a utility. The format was developed with help from Howard Rubin and Associates and International Data Corp.'s Technology Investment Strategies Corp.

Fault tolerance
Ratings for fault tolerance were based on the evaluators' tests of Ramac's fault-tolerant capabilities because users had no failures at the time of the evaluations.

Ramac duplicates the power supplies in the rack. Each drawer has two fans and its own battery, making the cache nonvolatile. This plus Ramac's RAID 5 implementation instilled a high level of confidence in the evaluators.

Manufacturer: "We tested the dynamic sparing feature before we fully populated the database, and it worked as billed." Dynamic sparing maintains data availability by automatically copying data from a failing drawer to a designated spare drawer.

Financial services: "The mean time between failures, according to IBM, is 1.5 million hours for one disk. But the probability for failure increases by the number of disks, which for us is about 50 disks. But even that is only about one every two years."

Ease of use
Contributing to Ramac's ease of use was the evaluators' familiarity with IBM's 3390 storage technology. Ramac's installation was not an issue because it was done by IBM. However, microcode changes made to the controllers were not effectively communicated to users. This caused the data's initial load time to be longer than IBM had predicted.

Manufacturer: "It was very easy for us to use because it's just like the 3390s we had. But the initial load time for each address, which IBM said would take only 20 minutes, took almost an hour. We eventually fixed the problem through some code changes."

Capacity
None of the evaluators had grown Ramac to the full 90.8G-byte capacity, although all said they expect to. The ability to run two Ramac systems off one controller made the evaluators comfortable with Ramac's scalability, but most felt left in the dark about IBM's plans to move to double-density disks.

Utility: "We only have 13 out of 16 possible drawers in right now, so we can still grow it a bit further before we need to roll in another Ramac. And even then, we are still able to hook it up to our existing controller."

Financial services: "There are unknowns about whether [IBM is] going to come out with the double-density disks or not. I could add another 90G bytes today, but not [until] I know their plans."

Speed
Ramac performance relies heavily on the attached storage controller. Evaluators using 3990 Model 3 controllers had throughput improvements as high as 50%. And while IBM says Ramac's performance is comparable in most situations to a 3990 Model 3 with a Model 6 controller, users using the Model 6 controller with Ramac also saw improvements.

Financial services: "We were using a 3390 Model 3 in conjunction with a 3990 Model 3 controller and were getting a response time of 16 msec. With Ramac on our [3990] Model 3 [controller], we were getting 8 msec response times."

Cost
In past years, the competition has used price against IBM. But now IBM includes small to medium-size companies among those customers it's willing to bargain with.

Manufacturer: "Their competition has been eating them alive here for a while. But now they're starting to deal. You have to fight hard and long, but we normally have been winning." ■

Burden is *Computerworld*'s senior researcher, Firing Line/Scorecard.

IBM has always bargained with its largest customers, but now they are bending for smaller shops as well to push Ramac into the market.

"I was about ready to roll in EMC when I heard back from IBM. [IBM] typically lets it go down the wire, but generally they have been coming back with the best price."

KELLY HIGGINS, manager, data services
Crawford & Co., Tucker, Ga.

Ramac: High on reliability but not on capacity

IBM San Jose, Calif. (800) 426-4968

Ratings are based on a 1-to-10 scale, where 10 is best. Ratings represent the average ratings of nine Ramac users interviewed in the Buyers' Satisfaction Scorecard survey, weighted by the categories' importance. Total score is the average of all ratings.

TOTAL SCORE	7.1
RECOVERY FROM FAILURES	9.6
EASE OF USE	6.7
CAPACITY	5.6
SPEED	7.2
COST	6.6

Vendor Response

Double-density HDA
IBM plans to make 4G-byte double-density Head Disk Assemblies (HDA) to replace the 2G-byte HDAs available to Ramac customers around midyear. Pricing has not yet been set.

Initial load time
We have had reports of long load times for early Ramac customers. The problem has been corrected in all 3990/Ramac installations through microcode and procedure changes.

Additional I/O bus paths
The complementary manner in which the subsystems and drawer caches operate has improved Ramac's ability to efficiently use its four internal bus paths. For those customers who require additional bus paths, the Ramac Array Subsystem Model 3 provides eight data paths.

OPEN SYSTEMS RAID SWEEPS INTO THE MIDRANGE

BY AVERY L. JENKINS

As the market for RAID storage continues to grow across the board, midrange RAID vendors are sporting a new open look for their systems.

Midrange RAID storage, whether supplied by the system manufacturer or a third-party vendor, formerly focused on the single-system environment. If you wanted RAID for your VAX, you bought from Digital Equipment Corp. or Micro Technology, Inc. If you wanted RAID for your AS/400, IBM or XL/Datacomp, Inc. would supply it.

Today, however, the single-vendor paradigm has fallen by the wayside. Vendors have heeded the open systems call and are now providing RAID storage systems that can often support multiple computing environments in a single storage subsystem.

This form of open, centralized RAID storage "makes it easier for users to manage their total storage environment," says Tom Lahive, direct-access storage device (DASD) subsystem analyst at International Data Corp. (IDC) in Framingham, Mass.

In addition, "users can keep their dollar-per-megabyte costs low because of higher volume purchases" for the centralized storage server, Lahive adds.

For the vendor, such an approach makes good economic sense. While the DASD market for the midrange remains relatively large — for example, IDC values the AS/400 DASD market at about $1.9 billion annually — growth overall is flat.

Why RAID?

Companies forging ahead with open systems strategies once saw little need to equip their midrange systems with RAID devices even though they were worried about the gaping holes in the systems' ability to provide reliable, storage for far-flung servers.

As mission-critical applications continue to migrate from the mainframe, the need for fault tolerance and high performance/high availability is traveling with them. Thus, midrange data protection requirements are taking a different form today than in past years. In addition, both small and large information systems organizations must manage ever-increasing amounts of data in shrinking storage floor space.

High availability and fault tolerance in a small package are the basic promises of RAID devices.

Buying disk insurance

Despite the move toward open architectures, the system vendor is still the first place most users turn for storage support. Compatibility and security with installed systems are key drivers of this trend.

IBM, Digital, Hewlett-Packard Co. and Data General Corp. all supply internal RAID storage for their systems. "Some midrange vendors can offer five bays of internal storage," which translates into 10G bytes to 20G bytes of disk space, Lahive says.

The open systems approach is providing users with more options, however, especially among third-party suppliers.

Third parties are competing with the systems vendors by "selling RAID with a lower cost-per-megabyte and higher functionality," Lahive says.

Micro Technology, for example, has been a mainstay in the Digital RAID market for several years, with its ability to connect to Digital's proprietary buses. More recently, it has expanded its StorageWare servers to support Ethernet, Fiber Distributed Data Interface, Unix and Network File System computing environments, among others.

Likewise, EMC Corp. has also expanded beyond the mainframe market to provide midrange RAID storage for Unix and a variety of network operating systems.

Spotting the differences

The move to support open systems has not obliterated the differences among the products. Among the systems vendors, IBM and Data General are generally considered the leaders.

IBM "is an overlooked success. They have shipped more [of their RAID products — 50,000 units] than all of the other vendors combined," says Mike Kahn, chief executive officer of the Clipper Research Group in Wellesley, Mass. "IBM was one of the early leaders in the midrange, in particular."

Data General's Clariion RAID line is "very solid," says Farid Neema, president of Peripheral Concepts, Inc., a market research and consulting company in Santa Barbara, Calif.

And while analysts regard Digital's products as technically strong, the company is not a strong force outside of its own installed base.

"Somebody who has been buying storage from Digital would be comfortable buying RAID from Digital," Kahn says.

Digital uses a "very modular hardware approach, and they have included software and hard-

Midrange systems, *page 84*

XL/Datacomp most reliable, EMC lowest priced

Early field test results from AS/400 sites place XL/Datacomp's 9638 Model 140 at the top of the pack in terms of reliability for four leading RAID devices. The product, which has been available for about four months, achieved the best mean time between failures total of all the models. EMC's Harmonix HX3SR Model 4 achieved the second-best total with less than three months in the field.

Sites surveyed by Reliability Ratings in Needham, Mass., reported that XL/Datacomp's 9638 was strongest in performance. EMC's users were happiest with reliability and performance.

Fault tolerance was also the high point of IBM's 9337-225, with capacity and price being the weaknesses.

IPL accumulated the shortest mean time between failures of the four devices. All but one of the failures occurred on the 7037 Model 40. Overall, the IPL sites cited price/performance as the strength and service as the main weakness.

Prices for the devices were typically below $2 per megabyte, with one EMC site reporting $1.70 per megabyte for 24G bytes of DASD. Some sites reported discounts as great as 30% to 40% off the list price.

PRODUCT	TOTAL HOURS IN USE	FIELD MTBF* (in hours)	ANNUAL FAILURE RATE**
XL/Datacomp 9638-140	575,904	575,904	1.40%
EMC Harmonix HX3SR Model 4	1,168,128	389,376	2.07%
IBM 9337-225	487,200	243,000	3.31%
IPL 7037 Model 40	1,037,540	148,220	5.44%

* MTBF: Mean time between failures in terms of number of hours in the field.

** Annual Failure Rate: The number of hours in a year, 8,064, divided by the MTBF in hours.

Source: Reliability Ratings, Needham, Mass.

MIDRANGE MARKET LEADERS

(Based on worldwide 1994 revenue)

As the market shifts from proprietary to open systems, there are many midrange DASD vendors jockeying for position, according to International Data Corp.

AS/400 DASD

IBM Storage Systems
San Jose, Calif.
(800) 426-7299
REVENUE: $1.44 billion
SHARE: 88.3%

EMC Corp.
Hopkinton, Mass.
(800) 222-3622
REVENUE: $125 million
SHARE: 7.7%

IPL Systems, Inc.
Maynard, Mass.
(800) 475-3678
REVENUE: $25 million
SHARE: 1.5%

Memorex Telex Corp.
Irving, Texas
(800) 944-4455
REVENUE: $22 million
SHARE: 1.3%

XL/Datacomp, Inc.
Lisle, Ill.
(800) 323-3289
REVENUE: $20 million
SHARE: 1.2%

OTHER MIDRANGE

Fujitsu Computer Products of America, Inc.
San Jose, Calif.
(800) 626-4686
REVENUE: $336 million
SHARE: 9%

Hewlett-Packard Co
Palo Alto, Calif.
(800) 752-0900
REVENUE: $300.6 million
SHARE: 8%

NEC Technologies, Inc.
Boxboro, Mass.
(800) 632-4636
REVENUE: $256.2 million
SHARE: 6.9%

Digital Equipment Corp
Maynard, Mass.
(800) 344 4825
REVENUE: $190 million
SHARE: 5.1%

Market leaders, page 84

Midrange systems

CONTINUED FROM PAGE 83

ware for backing up hierarchical storage management systems," Neema says.

Of the third-party vendors, EMC and its recent Centriplex announcement have gained the most attention.

"The important thing about EMC is its flexibility and its ruggedness," Neema says. "EMC comes from the world of the mainframe, and they included some of these features on Centriplex."

"DEC has some of [Centriplex's] features but the emphasis is different in that EMC has included dynamic load balancing," Neema adds.

Dynamic load balancing, in a RAID context, allows a RAID array that is partitioned into different RAID levels, such as RAID 1 and RAID 5, to change the partitioning automatically, on demand and without stopping the system, Neema says.

Overall, however, the technical differences among the products are less important than other issues such as stability and support.

RAID "is a price and reputation game," Kahn says. "You are buying security. . . . Security comes more from buying a well-known name than a name you find in the back of a magazine." ■

> **This form of open, centralized RAID storage "makes it easier for users to manage their total storage environment."**
>
> **— Tom Lahive, IDC**

Jenkins is a freelance writer in Ansonia, Conn.

MIDRANGE MARKET LEADERS cont.

Tandem Computers, Inc.
Cupertino, Calif.
(800) 482-6336
REVENUE: $189.3 million
SHARE: 5.1%

Siemens/Nixdorf Information Systems, Inc.
Burlington, Mass.
(800) 225-1484
REVENUE: $130.5 million
SHARE: 3.5%

Unisys Corp.
Blue Bell, Pa.
(800) 874-8647
REVENUE: $123.7 million
SHARE: 3.3%

AT&T Global Information Solutions
Dayton, Ohio
(800) 225-5627
REVENUE: $88.2 million
SHARE: 2.4%

Micro Technology, Inc.
Anaheim, Calif.
(800) 822-8224
REVENUE: $75 million
SHARE: 2%

Original Equipment Manufacturers

Data General Corp.
Westboro, Mass.
(800) 328-2436
REVENUE: $74 million
SHARE: 61.3%

Formation, Inc.
Moorestown, N.J.
(800) 220-1209
REVENUE: 22%
SHARE: 18.2%

Digital Equipment Corp.
Maynard, Mass.
(800) 344-4825
REVENUE: $12.5 million
SHARE: 10.4%

Defacto RAID
The Standard In Advanced Mass Storage Systems
High-Performance SCSI RAID Systems

Raidtec is the world leader in completely open, SCSI-based hardware RAID controllers and subsystems which provide the best price to data-security-performance value.

- Fast & Wide SCSI II
- On-the-fly hardware parity generation eliminates read, modify, write-back performance overhead
- Programmable RAID Level selection
- Single ended or differential
- Configurable read & write buffers
- Downloadable flash firmware
- Remote alarms, configuration & monitoring
- Environmental sensor ports
- "Hot Replaceable" disk drive bays
- Two "Hot Replaceable" power supplies
- Solid state load sharing power subsystem
- LCD control panel status display

Raidtec RAID supports more hardware & operating systems than any other RAID offering...

HARDWARE
IBM RS/6000
Sun SPARC, SPARCENTER
HP 9000 Series
Apple Power PC
DEC
NetFRAME
Silicon Graphics
UNISYS
Intel 80X86, Pentium
ISA, EISA, MC, PCI, SBUS,
VME, NUBUS
Others.

OPERATING SYSTEMS
Microsoft DOS
Microsoft Windows NT
SCO UNIX; SCO ODT
UNIX
Novell NetWare
UNIXWARE
HP-UX
Solaris
Apple OS; AUX
IBM OS/2, AIX
Banyan VINES
Others . .

FlexArray IX, FlexArray FX

FlexArray IX features six hot replacement drive bays and dual hot replacement power supplies. Ideally suited for midrange, NT, OS/2, Unix and Netware server applications requiring up to 15 GB of fault tolerant, high availability data storage.

FlexArray FX supports Fast and Wide SCSI II interface. Its six channel SCSI to SCSI bridge controller supports data transfer rates up to 20 MB/Sec. Ideal for high performance data base, video, imaging and multimedia servers where high I/O rates, advanced diagnostics, remote administration and configuration are required.

RUAC MX

5.25" half height controller provides SCSI to SCSI 2 channel mirroring (RAID 1), 2 channel striping (RAID 0). Expands to protect two to 14 drives. The RUAC MX is well suited for work station and small server applications requiring fault tolerant data protection in the one to four GB capacity range.

Rack Mount Configurations - RUAC FX Controller and the FlexArray RX

Combine RUAC FX 19" rack mount RAID Controllers and FlexArray RX drive modules for infinitely flexible RAID solutions. Protect eight to over 200 GB of storage. Accommodate growth and expansion with the best Fast/Wide price-to-performance ratio in the industry. Efficiently handle the most demanding database, video, imaging and multimedia server applications. Eliminate concerns about hardware or operating system compatibilities.

Raidtec
CORPORATION
Tel (404) 664-6066

USA
105 Hembree Park Dr.
Suite C
Roswell, GA 30076
Tel.: (404) 664-6066
FAX: (404) 664-6166

EUROPE
Glen Mervyn House
Glanmire
Cork, Ireland
Tel.: (353) 21-821454
FAX: (353) 21-821654

Buying issues

CONTINUED FROM PAGE 79

er-configurable levels of RAID, including RAID 5.

The Warp product will use 3½-in. disks and 4G bytes of Hard Disk Assembly; capacities should exceed 1T byte of storage in a fully configured subsystem. IDC expects high levels of scalability and performance, as well as high levels of reliability and fault tolerance.

The outcome of these announcements in the already crowded large systems storage arena will create even more intense competition for end-user storage business. While these new products ensure HDS and Amdahl will not be left behind established storage suppliers from a technological viewpoint, IDC does not expect their market shares to change dramatically during 1995. ■

Callery is a research manager for storage and peripherals at International Data Corp. in Framingham, Mass.

Fill it out. Fax it in.

COMPUTERWORLD
Future desktop decisions loom
COMPUTERWORLD
Salary and Job Satisfaction Survey
'94-'95
Hot off the press! 1994–1995 edition

51 issues for only $~~4~~8. Now Only $39.95

FAX NO. 614-382-1058

Yes, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $39.95* per year - a savings of $8.00 off the basic subscription price. Plus, I'll also receive the new '94-'95 COMPUTERWORLD Salary Survey FREE just for trying COMPUTERWORLD.

P/Code 98

First Name ______ MI ______ Last Name ______

Title ______ Company ______

Address ______ City ______ State ______ Zip ______

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate: $48 per year

* U.S. Only. Canada $95, Mexico, Central/South America $150, Europe $295, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medical/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Dist./ Retailer
   - 95. Other______ (Please Specify)
2. **TITLE/FUNCTION** (Circle one)
   - **IS/MIS/DP MANAGEMENT**
   - 19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Network Sys., Data/Tele. Comm., LAN Mgr. /PC Mgr., Tech Planning, Admin. Services
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Programming Management, Software Developers
   - 41. Engineering, Scientific, R&D, Tech. Management
   - 60. Sys. Integrators/VARs/Consulting Management
   - **CORPORATE MANAGEMENT**
   - 11. President, Owner/Partner, General Manager
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - **DEPARTMENTAL MANAGEMENT**
   - 51. Sales & Mktg. Management
   - 70. Medical, Legal, Accounting Management
   - **OTHER PROFESSIONAL MANAGEMENT**
   - 80. Information Centers/Libraries, Educators, Journalists, Students
   - 90. Other Titled Personnel
3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)

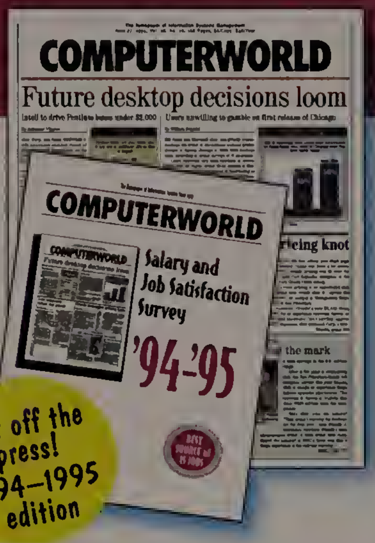
   Operating Systems
   - (a) Solaris
   - (b) Netware
   - (c) OS/2
   - (d) Unix
   - (e) Mac OS
   - (f) Windows NT
   - (g) Windows
   - (h) NeXTstep

   App. Development Products ☐ Yes ☐ No
   Networking Products ☐ Yes ☐ No

COMPUTERWORLD

E4505-8

Fill it out. Fax it in.


COMPUTERWORLD
Future desktop decisions loom
COMPUTERWORLD
Salary and Job Satisfaction Survey
'94-'95
Hot off the press! 1994–1995 edition

51 issues for only $~~4~~8. Now Only $39.95

FAX NO. 614-382-1058

Yes, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $39.95* per year - a savings of $8.00 off the basic subscription price. Plus, I'll also receive the new '94-'95 COMPUTERWORLD Salary Survey FREE just for trying COMPUTERWORLD.

P/Code 98

First Name ______ MI ______ Last Name ______

Title ______ Company ______

Address ______ City ______ State ______ Zip ______

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Basic Rate:$48 per year

* U.S. Only. Canada $95, Mexico, Central/South America $150, Europe $295, all other countries $295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medical/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Dist./ Retailer
   - 95. Other______ (Please Specify)
2. **TITLE/FUNCTION** (Circle one)
   - **IS/MIS/DP MANAGEMENT**
   - 19. Chief Information Officer/Vice President/ Asst. VP IS/MIS/DP Management
   - 21. Dir./Mgr. MIS Services, Information Center
   - 22. Dir./Mgr. Network Sys., Data/Tele. Comm., LAN Mgr. /PC Mgr., Tech Planning, Admin. Services
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Programming Management, Software Developers
   - 41. Engineering, Scientific, R&D, Tech. Management
   - 60. Sys. Integrators/VARs/Consulting Management
   - **CORPORATE MANAGEMENT**
   - 11. President, Owner/Partner, General Manager
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - **DEPARTMENTAL MANAGEMENT**
   - 51. Sales & Mktg. Management
   - 70. Medical, Legal, Accounting Management
   - **OTHER PROFESSIONAL MANAGEMENT**
   - 80. Information Centers/Libraries, Educators, Journalists, Students
   - 90. Other Titled Personnel
3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)

   Operating Systems
   - (a) Solaris
   - (b) Netware
   - (c) OS/2
   - (d) Unix
   - (e) Mac OS
   - (f) Windows NT
   - (g) Windows
   - (h) NeXTstep

   App. Development Products ☐ Yes ☐ No
   Networking Products ☐ Yes ☐ No

COMPUTERWORLD

E4505-8

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-2144

Coming in the February and April issues of Computerworld Client/Server Journal...

February 1 Issue

Cover Story: Can DCE Deliver?

The Open Software Foundation's Distributed Computing Environment (DCE) is touted as an all-encompassing technology for building next-generation distributed applications. *Computerworld Client/Server Journal* interviews several end-user organizations, including Charles Schwab & Co., to find out how it's working.

Vertical Industry Focus: Banking

How this industry is capitalizing on client/server networks to help them provide new revenue-generating products and services while streamlining costs.

Product Focus: Networking

Our What's New feature takes a look at Internet access and administration using Spry tools.

Firing Line offers user reviews of Novell's NetWare 4.1.

Plus a new product roundup on networking tools from TGV, NetFrame, Digital Equipment Corp. and Security Integration.

Cover Story: Performance Planning

What are organizations doing to ensure that their new distributed systems perform at levels that exceed those of the legacy systems they're displacing? *Computerworld Client/Server Journal* examines the technologies, managerial issues and fine-tuning techniques that go into this planning process.

Vertical Market Focus: Health Care

How are hospitals and HMOs using the distributed computing model to revamp their business processes?

Product Focus: Database Management Tools

Our Test Drive feature takes a look at Personal Oracle 7.
Firing Line reviews Sybase database management tools.

April 1 Issue

Ad Close: February 8

COMPUTERWORLD
CLIENT/SERVER
JOURNAL

Where distributed computing meets business objectives

Computerworld's bimonthly magazine on distributed computing gives you the blend of technology, managerial issues and business strategy involved in its deployment across the enterprise.

SOUND OFF!

AT ISSUE: *Let the war of words about component standards begin. An OpenDoc backer says the technology is much more elegant and feature-rich than OLE. An OLE proponent counters, saying OLE's object technology outstrips fledgling OpenDoc.*

ZIGY KALUZNY

OpenDoc *vs.*

> *"OLE's roots in application linking make OLE apps large, slow and unnatural for users and developers."*

By Cliff Reeves

OPENDOC *proponent*

Comparing OpenDoc with OLE/COM is like comparing a modern human with a Neanderthal. There are similarities. If you were to dress a Neanderthal in a suit and stand way back, the two might even look the same. But you would have to look much closer if one was going to help run your business.

Being competitive means being able to react and adapt to change quickly. Component software holds the key. OpenDoc was designed to build flexible applications based on components. On the other hand, Object Linking and Embedding (OLE) and its Common Object Model (COM) were designed to link the monolithic, general-purpose applications of the past. OLE/COM represents an earlier branch on software's evolutionary time line.

A component standard must evolve smoothly and be widely available and easy to use. OpenDoc is the only software component standard available that meets this criteria. It is available today for Windows, Mac OS and OS/2. IBM has announced plans to make it available for Unix systems, OS/400 and MVS.

Novell, Inc.'s WordPerfect, Apple Computer, Inc. and IBM have shipped developer's kits to more than 54,000 developers worldwide. Many software vendors, including Taligent, Inc., Adobe Systems, Inc., Novell, Apple and IBM, will ship OpenDoc components and tools in 1995.

The software that provides a competitive edge for businesses is a rich brew of commonplace and specialized parts. We'll buy some parts off the shelf; systems integrators will customize others; and we'll handcraft a few ourselves. This open mix-and-match environment will increase application flexibility and reduce costs. OpenDoc is built for this environment.

OpenDoc raises the bar for user and developer functionality. It provides the following set of functions by which you must judge any component technology:

- Object management services, based on IBM's System Object Model (SOM), that comply fully with the Object Management Group's (OMG) Common Object Request Broker Architecture. These services enable components to be accessed and protected wherever they are. You can add or replace components at will, reacting quickly to fleeting business opportunities.
- Component services, based on Apple's Bento file format, that are widely used by Lotus Development Corp. and others. These services enable users to save and exchange component data. As one department develops new business information, other departments can act on that information quickly. Compound document and automation services, which include Apple's Open Scripting Architecture, enable developers to customize applications easily and reduce the cost of training users.

OpenDoc was designed to grow smoothly for developers and users so applications can pick up new features quickly and inexpensively. Thomas J. Mowbray, lead scientist at Mitre Corp., recently commented on this flexibility in the November/December 1994 issue of *Object* magazine. He observed that, unlike OLE/COM, OpenDoc was "designed with extensible architectures that do not require substantial revision to support specialized application requirements." This is because OpenDoc was designed for extensible components — real objects — rather than for applications.

For example, OpenDoc's In-basket can quickly be extended to sort and filter mail. Real object technology makes OpenDoc components small, efficient and easy to develop. In comparison, programming for OLE is complex and inflexible. OLE 1.0, with 50 unique application programming interfaces (API), was a difficult enough proposition. OLE 2.0's 400 APIs traumatized developers and demanded substantial application restructuring.

A big hindrance

OLE's COM — the way OLE developers must define their components — just makes things harder. It is a specification (not an implementation) that each developer must implement, yet it prevents developers from efficiently extending components by subclassing them. COM has so many restrictions that Digital Equipment Corp. has taken on the task of fixing it.

OpenDoc was developed concurrently on multiple platforms and will adapt to the software and network services you need to run your business. For example, WordPer-

OpenDoc, *page 88*

CLIFF REEVES
is director of Object Technology Products at IBM's Personal Products Division in Austin, Texas. You can reach him at cliffr@austin.ibm.com.

OLE/COM

"With OLE, I know my investments in software and training won't be lost."

JAY REED

By Robert Bismuth

There isn't much argument in my mind who wins the OLE/COM vs. OpenDoc war. Object Linking and Embedding (OLE) beats out its rival from both a business and technical standpoint, so much so that this war is a pointless waste of time and effort.

The advantages of using OLE include a clear evolutionary path from today's most popular personal productivity applications to "componentware." And its distributed Common Object Model (COM) provides a path to distributed objects.

Both OLE/COM and OpenDoc have the goal of facilitating componentware — that is, software modules from multiple vendors that can be assembled to create applications. The idea is to let users access different application tools in the same document. Both technologies use software objects, and both plan to provide support for distributed objects.

But while OpenDoc is still in its infancy — source code is just now shipping — OLE has been out there since the spring of 1991. OLE is available on Windows, Windows NT and Mac OS.

Think of it this way. If you're a technical manager in a large user organization, what would you bet on: newly minted (do I dare say untried?) OpenDoc, or OLE, complete with its Microsoft Corp. clout and installed base of Windows developers? About 60,000 OLE software developer's kits were shipped before the kits were bundled with Visual C/C++, and many more have gone out since then.

OLE 2.0 also has the force of hundreds of independent software vendors creating user products; at Comdex/Fall 1994, Microsoft's developers list contained 433 companies shipping OLE applications.

Microsoft (and the Windows de facto standard) are so well established that it is hard to imagine throwing out the current investment and turning to fledgling OpenDoc. It just doesn't make financial sense.

Technically speaking, OLE is a beauty. The object technology underlying OLE, Digital Equipment Corp./Microsoft's COM, is much more constant than that found in OpenDoc. Every OLE object is by definition a COM object. And the network distribution of objects that today exist only locally has been a major COM design goal.

So far, OpenDoc alpha releases have used C++ libraries for object support. Subsequent releases will move to IBM's System Object Model (SOM) and then to Distributed SOM (DSOM). Talk about driving developers crazy; they will have to learn three different programming models as they move from C++ to SOM to DSOM. In contrast, COM is COM, including in networked environments.

OLE/COM *proponent*

OLE is not only farther along the path to componentware and distributed objects, but it also has the clearer path.

Take the issue of being able to determine an object's functions without any prior knowledge of the object — an important aspect of componentware. COM's built-in query interface capability addresses this and, again, was designed to work efficiently in a distributed environment.

OpenDoc has grafted on a similar mechanism in its C++ libraries — you make a special call on an object asking it whether it supports an extension. If it doesn't, it says so. If it does, it returns a pointer to a new extension object that has the desired function. Sounds just like the query interface functions in COM, doesn't it? It's curious that even though SOM/DSOM proponents denigrate this COM capability, the plan is to include something like it in the SOM/DSOM iteration of OpenDoc.

Unfortunately, OpenDoc's query-interface-like feature will be much more complex, and, because it is not built-in, SOM/DSOM will require an unknown amount of extra network traffic to support it.

OpenDoc proponents brashly say OpenDoc is revolutionary while OLE is evolutionary. Give me OLE's evolutionary approach every time; revolutions tend to be painful and bloody for all concerned. With OLE, I know my investments in software and training won't be lost. I know my old interfaces will continue to receive support. With OLE, people can evolve their computing infrastructure at their own rate.

When you look at some of the "revolutionary" aspects of OpenDoc, they don't stand up to OLE's comparable approaches:

- Object activation. OpenDoc touts its "inside-out" object activation, in which all objects must be activated before a user can

OLE/COM, *page 88*

ROBERT BISMUTH *is director of corporate standards at Digital Equipment Corp. in Littleton, Mass., and represents Digital on the board of the Object Management Group. He can be reached at bismuth@ljsrv2.enet.dec.com.*

OpenDoc

CONTINUED FROM PAGE 86

fect has added functions that enable OpenDoc components to work seamlessly with OLE applications and vice versa. In 1995, IBM will extend its SOM network support to include the Open Software Foundation's Distributed Computing Environment naming and security and the OMG's transaction services.

In contrast, Mowbray says, OLE/COM will be suitable only for Microsoft's desktop systems and proprietary tools. OLE is further tied to Windows because "COM's APIs are heavily dependent upon Microsoft's C++ implementation," he says.

Microsoft says it will implement distributed OLE in Cairo, which is presumably now delayed in the same way as Windows 95.

OpenDoc makes users more productive and lowers training costs because it is efficient to use. OLE's roots in application linking make OLE applications large, slow and unnatural for users and developers. For example, no OLE component can exceed a page in length, one cannot overlap another, and each must be rectangular in shape. Also, only one OLE component can be active at a time.

Microsoft has committed to fixing these problems, but past history shows its heritage of missing features, frequent and disruptive upgrades, inconsistent implementations and bloated systems that perform poorly.

So, there you have it. If you plan to use only Windows, if all your software is off the shelf, if your business doesn't run a network and if you don't mind replacing your software every two years, then hire the Neanderthal. ■

UniForum'95™

Building Solutions Through Open Computing

If you only go to one Open Computing event, this is the one!

Whether you're an Open Computing expert or evaluating the benefits of an open environment, this is the place to learn about the next level of client/server computing, PC integration and downsizing from a mainframe. Visit hundreds of exhibiting companies including Compaq, Digital, Hewlett-Packard, IBM, Novell and SCO. Participate in the industry's most important Open Computing conference—over 100 sessions, seminars and tutorials on interoperability.

And don't miss a new world of hands-on attractions including The Internet Experience, live demonstrations at OpenNet (The Common Desktop Environment Pavilion), the ISV Pavilion, the New-to-Market Showcase, and the first annual UniForum Open Awards!

NEW! UNIFORUM ON-LINE REGISTRATION! Register for UniForum '95 on the Internet — plus get all the latest information on exhibitors, conference sessions and speakers, special attractions and more!

Internet
World Wide Web URL: http://www.uniforum.org

OR REGISTER BY FAX! Call 617-449-5554, enter Code 28 and have your fax number ready — we'll fax back your registration form within 24 hours!

Conference: March 12–16, 1995 • Exposition: March 14–16, 1995
Dallas Convention Center • Dallas, Texas

Sponsored by UniForum, The International Association of Open Systems Professionals. Now managed by The Interface Group, producer of COMDEX.
©1994 The Interface Group • 300 First Avenue, Needham, MA 02194-2722 USA (617) 449-6600 • UN6434 11/94

OLE/COM

CONTINUED FROM PAGE 87

view the document. That leads to long start-up times. Some users may appreciate how long it takes to open a document (they'll have time to get coffee), but most will not.

And that's when the objects are local. Imagine how much longer start-up will take when objects have to be retrieved from across the network.

Inside-out activation also requires the presence of a part editor or viewer for each type of object. While Component Integration Laboratories (OpenDoc's sponsor) encourages OpenDoc parts developers to provide free viewers, this is not a guarantee. If the local editor/viewer is unavailable, the user is stuck. The object cannot be displayed at all, leaving a hole in the document.

OLE supports object activation as needed (even all at once, if you want). It also provides for a "last view" of an object so that any application (or stub handler, available on every OLE/COM system) can present a foreign object as a visible, known quantity, even if it cannot be edited locally.

- Application vs. component integration. OLE was designed to integrate applications; OLE controls provide evolution to componentware. That's because the OLE application can run stand-alone or as part of a collection of components, whichever makes more sense for a business. OpenDoc parts function only in the OpenDoc environment, leaving users of today's applications in the lurch.

OpenDoc proponents realize OLE is used everywhere for compound documents today, so its backers have promised to add OLE support. How interesting. Unfortunately, adding OLE support means adding yet another layer of software to access OLE/COM interfaces. Who will pay for all this? The cost will likely get passed on to whoever invests in or buys OpenDoc.

Forget OpenDoc. OLE/COM provides more capability today. ■

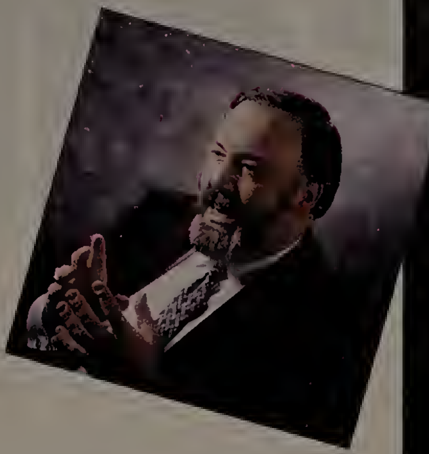
OBJECT WORLD

Putting Objects To Work In The Real World 1995

UPDATE №3

Register for Object World Boston '95. And hear how Xerox puts OT to work.

Recently, we met with Object World session speaker Al Nugent of Xerox Corporation to talk about the impact of object technology (OT) at his company. Mr. Nugent holds the expansive title of Executive Vice President, Application Architecture and Design, Global Process and Information Management, Object Technology Competency Center (OTCC). He's also a member of the Object Management Group's (OMG) Board of Directors. This interview gives you a taste of what you can expect from the in-depth conference sessions at Object World Boston.



That's quite a title. What does it all mean?

"In a nutshell, our charter is to facilitate the adoption of modern software engineering practice using object technology at Xerox Corporation. My team, the OTCC, is responsible for managing the architecture and design of distributed object services that support the rollout of all new globally deployed applications."

How long have you been working with object technology?

"Longer than I like to think. I started using object-oriented languages back in grad school, and my career has evolved around open systems and leading edge software principles and practices. So my experience in software development is based on understanding process, selecting and using the proper abstractions, and focusing on design rather than code. I joined the OMG board in 1989 and have been an active member of the distributed object system community since then."

What changes have you seen as OT has moved into the mainstream?

"Well, the big impact on our work at Xerox is that the scope has expanded to include organizational learning, the impact of technology on corporate culture, reward and recognition for object-based development, high performance team building, collaborative work environments, effective mentoring and training techniques, and transformation of business processes into actionable systems."

How does Xerox put object technology to work?

"First and foremost, Xerox has challenged itself to be business-process driven. Our motivation for using objects is to continue to provide the best products and services to our customers. This is not technology for technology's sake. As a result, we embarked some time ago on a company-wide reengineering drive that resulted in the Xerox Business Architecture. And it's in this context that we're using OT. The object approach gives us the opportunity to analyze and design business processes down to the work flow or task level, then easily translate the products of analysis into application design, development, and deployment."

What led Xerox to adopt object technology?

"The decision to adopt OT was made prior to my arrival at Xerox. Our worldwide CIO, Pat Wallington, and her team created IM2000, a set of key strategies to guide our information management into the next century. Our adoption of OT has been leveraged off the strong tradition of software analysis and design practices within IM and our divisions. Our legacy outsourcing agreement with EDS has provided us with a tremendous opportunity to engineer business processes, integrate technology, and build new global solutions designed to make our business more effective."

What kind of benefits has Xerox realized from employing OT?

"Most of the OT work I've been describing here is now in progress. Some earlier pilot activity inside Xerox has yielded a high degree of reusability for both code and designs, quicker time to market, and a high developer productivity and satisfaction. One side effect of OT is improved communications. OT enables us to discuss the solution to the customers' problems in their own vocabulary."

What will people learn about OT at your Object World sessions?

"The first is an evangelical session highlighting the benefits and realities of OT products and services. The second is a case study of OT adoption and use at Xerox. In the case study session, I'll describe the critical success factors for corporate-wide OT adoption. I'll also provide a real-world, large-company perspective on the benefits and realities of a migration to object technology, and an understanding of the relationship between business process management, object technology, and solutions deployment. My sessions will give them a head start on realizing the benefits of OT for their companies and themselves."

Don't miss Al Nugent and other OT movers and shakers at Object World Boston. No other OT conference offers you a broader range of subjects or greater technical depth. You can choose from 15 tutorials and 54 conference sessions—many are based on actual case studies and feature OT users and industry experts.

DISTRIBUTED APPLICATIONS FOR THE REAL WORLD

OBJECT WORLD

Boston • March 19-23, 1995 • Hynes Convention Center

To register or for more information, call 800-225-4698.

Register for Object World Boston by February 17 and save $200 on the conference program. Or sign up for a FREE Exhibits Pass!

HOW TO RESERVE YOUR PLACE:

By Mail: Fill out this coupon and mail it to Object World Boston, P.O. Box 9107, Framingham, MA 01701.

By Phone: Call us toll-free at 800-225-4698 in the U.S. or 508-879-6700.

By Fax: For fastest service, fax this coupon to 508-872-8237.

By E-Mail: OMG@OMG.ORG
Type the word "help" by itself in the body of your letter, and the server will send you complete instructions. To receive a list of available files, type the word "index" on a separate line.

By World Wide Web Server:
http://www.idgwec.com
Select Object World Boston.

MONEY-BACK GUARANTEE MONEY-BACK

Object World offers you a no-questions-asked, money-back guarantee on the full conference program, so you have absolutely nothing to lose. Reserve your place—and your $200 discount—today. Discount ends February 17.

Sponsored and Produced by:

IDG WORLD EXPO
COMPUTERWORLD The Newspaper of IS
OMG OBJECT MANAGEMENT GROUP

(Check one only)

- ☐ Reserve—without obligation—my $200 discount on the full conference program.
- ☐ Please rush me more information about the full conference program and register me for my FREE Exhibits Pass.
- ☐ Register me for my FREE Exhibits Pass—a $50 value.
- ☐ I'm not ready to register at this time. Please send me more information about:
  ☐ Attending ☐ Exhibiting at Object World Boston.

Please print or type clearly. Inquiry Code: CW7

Name ____________________

Title ____________________

Organization ____________________

Street ____________________

City/Town ____________ State/Province ____________

Zip/Postal Code ____________ Country ____________

Phone ____________ FAX ____________

Internet/E-Mail ____________________

© Object World is a registered trademark. No one under 18 admitted

Conference Call

WORLDWIDE
CONFERENCE ON
INFORMATION
SYSTEMS
EDUCATION
EDSIG
Serving Information Systems Educators
1 9 9 5

EDSIG's Worldwide Conference on Information Systems Education
Suburban Denver, Colorado
June 11-14, 1995

For more information, call
1-800-488-9204

Clip and ***FAX*** *this coupon to* ***1-508-875-3202*** *or call* ***1-800-488-9204*** *for more information.*

Please place my name on your mailing list, so I'll receive registration materials and information throughout the year.

Name ______________________ Title ______________________

Institution or Company ______________________

Address ______________________

City ______________________ State ________ Zip Code ____________

Phone ____________ Fax ____________ e-mail ____________

WISE

Calming Windows anxiety

The fear of leaving mainframes behind and learning Windows development is valid, but it doesn't have to be crippling

By Dana P. Crenshaw

It's been seven months since I began developing Windows applications, and I admit the transition hasn't been painfree. Five years of mostly mainframe development had lulled me into a certain way of thinking and programming, but with hard work and plenty of initiative, I made the transition.

Admittedly, the technology is difficult, but don't let anyone kid you. The fear of failure can be debilitating. For me, failing at an opportunity to develop for Windows meant being sentenced to old technology with an uncertain future. But once I started, my confidence grew.

Confronting the obstacles

Overcoming the initial anxiety was only half the battle. New challenges constantly present themselves. The differences between Windows and mainframe environments made application development frustrating. While not as frightening as the initial hurdles, the new challenges were aggravating nonetheless.

For me, an especially frustrating contrast was the location of the program code. On the mainframe, code resides in one file. This file houses related functions and procedures, making it easy to read and debug. But this is not the case in Windows.

Windows applications have objects. Each object has code that enables it to carry out a task completely. Where I used to have *one* file containing hundreds of lines of code, I now have small independent packets of code with maybe 20 lines. Mentally, it takes more effort to maintain the big picture from within a tiny test tube. This forces me to make sure each individual part is complete within itself. In other words, emphasis is placed on the parts that make up the whole.

Another disturbing difference was the lack of control I had over the program's flow. On the mainframe, I could code a "DO WHILE … ENDDO" or a "FOR … NEXT" sequence that would be in control. Any other program that needed resources had to wait until my program finished. This also limited the user to running one operation at a time. In contrast, the Windows environment maintains control, allowing it to respond to other applications that request its resources.

Not only does Windows force me to be unselfish, but it also helps me write intelligent code — code that is sensitive to the environment and the user.

Smaller hurdles

Not every challenge is a major one, however. The design of flowcharts, for example, is slightly different. Honestly, I'm still working on this one. A flowchart for Windows applications seems to consist of a set of disjointed flowcharts for each function the user could perform. The functions are all self-contained.

Another is the use of buttons rather than function keys. On-line mainframe applications rely heavily on function keys to initiate actions. Windows has buttons that serve the same purpose except that the code lies behind the buttons and carries out the function completely. These are minor differences, but they're frustrating if they catch you by surprise.

I'm still learning, of course, but the more I read about and study Windows, the less I worry about failing.

Currently, I'm developing in Windows and DOS, and I have become familiar with Microsoft Corp.'s Visual Basic and Visual C++, Powersoft Corp.'s PowerBuilder, Borland International, Inc.'s C++ and Computer Associates International, Inc.'s Visual Objects. I'm also working with a friend on a project converting a church data management system written in Clipper to Windows using Clip4Win — a third-party tool for Windows application development.

I no longer rely solely on my mainframe programming background. I knew that Windows was a different animal, and if I wanted to tame it, I had to learn some new tricks. ■

PAVING THE WAY

August 1988 to June 1993:	August 1993:	October 1993 to present:	February 1994 to May 1994	June 1994 to present:
Employed as a mainframe programmer. Began reading books about Microsoft's Windows and client/server technology.	Purchased and learned Microsoft's Visual Basic.	Hired by current employer to do Clipper development. Began experimenting with C++ by prototyping.	Received training in Powersoft's PowerBuilder 3.0. In May, began working on a team to convert a DOS-based application to Windows using Clipper and Clip4Win.	Attended introductory seminar for Computer Associates International's Visual Objects. Received formal training in Visual Basic.

Crenshaw is a senior staff consultant at Orkand Corp. and a freelance writer in Atlanta.

CONSULTING

Contract Solutions is offering long-term consulting opportunities locally ond throughout the United States. Most positions pay between **$80,000-$130,000** per year.

◆ORACLE FINANCIALS REL 9 & 10
◆ORACLE DBA
◆VAX, C++
◆ORACLE, MANUFACTURING
◆ORACLE FINANCIALS DBA
◆PROGRESS V.7
◆COBOL, DB2
◆X11, PHIGS
◆CICS, TELON
◆ORACLE V.7 FORMS 4.0
◆SYS. ADMIN, SUN, UNIX
◆VMS, ACMS, COBOL
◆SUN, X, CDE
◆AS/400, JDE, MRT
◆MULTIGEN, 3D GKS
◆SUN, NFS/NIS
◆ORACLE CASE 5.0, 5.1
◆VISUAL C++
◆TANDEM, COBOL, SQL
◆OS/2, C++, S.O.M.
◆ALPHA AXP/OSF1, C
◆IMS DBA
◆SAP R3
◆INFORMIX, UNIX, DBA
◆MVS, CSP, DB2

Contract SOLUTIONS®

Two Keewaydin Drive
Salem, NH 03079-4875
800-998-csi 1 (2741)

603-893-6776
FAX: 603-893-4208
email csinat@mv.mv.com

Consulting

PCS GROUP, a Sybase Teaming Partner is a recognized provider of management consulting, client server integration services, and a developer/marketer of such tools as Gen SP© & GDE© for Sybase, has **immediate** openings for consultants with at least three years of industry experience:

Client Server
- Powerbuilder
- Oracle
- Oracle/Vax Cluster
- Sybase
  SQR
  DBA
  APT
- C++
- Visual Basic
- C/Embedded SQL

Mainframe
- COBOL
- VSAM
- Easytrieve
- DB2
- Focus
- IDMS
- CICS

Midrange
- Synon
- AS400

Miscellaneous
- Windows dev.
- Foxpro
- MicroFocus COBOL
- OS-2
- Client/Server Integrator
- XCEL\net

PCS Group offers exceptional training opportunities in Sybase & Powerbuilder, outstanding incentives and excellent benefits. PCS Group is 100% committed to customer & employee satisfaction. Please send resume to: **PCS GROUP, 9300 Shelbyville Road, Suite 1103, Louisville, KY 40222, 800-682-9784, 502-339-2900, FAX: 502-339-2888.**

Equal Opportunity Employer

PCS GROUP
PROFESSIONAL CONSULTING SERVICES

MAXIMIZE YOUR CAREER POTENTIAL

For over 22 years Triple-I/Information Industries, Inc. has been delivering Information Technology solutions to many of the country's largest Fortune 500 companies.

Currently we are looking for quality-minded professionals with experience in OOA/OOD/OOP techniques, database administration or telecommunications applications development

Opportunities Exist in Denver, Kansas City and Chicago

The following are a few of the positions we are looking to fill immediately:

C/C++ Programmer

2+ years experience in C/C++/UNIX development Working knowledge of one or more of the following X-Motif Oracle (v 6 or v 7), OO techniques.

iii
Triple-I

Sybase Development & Data Base Administration

3+ years' progressive data base programming, physical data design and/or logical data modeling

Telephony Applications Development

2+ years' developing applications in a telephony environment required Familiarity with: Call Processing ISDN, SS7, AIN ATM, SONET, Cellular switching or Bellcore specifications preferred

Software Testing Specialist

2+ years experience testing C/C++ applications Knowledge of software quality assurance and software development techniques are essential

Positions require a BS degree Triple-I offers an attractive compensation package and relocation assistance For more information about these and other available opportunities please contact Triple-I Attn Kim S Foley 6330 Lamar Ave Suite 230, Overland Park, KS 66202 Fax (913) 262 3452 or Call (800) 444-8101 x 2077

OUTSOURCING, NOT ALWAYS A DIRTY WORD

Systems administrators find opportunity in unlikely places

By Leslie Goff

For awhile, it looked like outsourcing would eventually displace systems administrators, but supply-side economics is playing out in their favor. Outsourcing firms need more people with administrative skills than are available. Recruiting is heavy, and salaries are skyrocketing.

Moreover, the opportunities are plentiful across the board, whether you come from traditional mainframe and midrange systems administration or an open systems, distributed technologies orientation.

That's because systems administration is evolving from a low-growth position associated with legacy systems into a key career path.

"We look at the position more as systems management and administration, a position more on the networking side of the house," says Rick Schwartz, a program director at BSG, a consulting firm in Houston. "The responsibility is heightened because the function is more complex."

Outsourcing firms are looking to both sides of the skill pool for talent: traditional data center administrators with exposure to networking and open systems and network administrators who have experience with centralized management tools.

Administrators with distributed systems expertise clearly have the upper hand, especially if they apply directly to outsourcing firms. But traditional systems administrators who show initiative have similar opportunities.

When a company chooses to outsource systems administration, it typically makes a deal with the vendor to absorb existing staff for a required time. If you find yourself in this position, use this period to learn more about client/server technologies, Unix-based systems management tools and basic networking principles.

Outsourcing executives say staffers who demonstrate the drive and ability to adapt their skills to a distributed environment can take their careers further in a vendor firm than in a client firm.

"You have a broader level of opportunity in an outsourcing company," says Scott Lahti, president of the outsourcing operations division at Systematics Financial Services, a subsidiary of Systematics Information Services, Inc. in Little Rock, Ark. "We still have a need for traditional systems administration, but we also have other positions available that are more LAN/WAN-oriented, so that's another avenue for career growth."

Lahti won't comment on specific hiring projections for this year but notes that Systematics, which has traditionally targeted financial services companies, is expanding into health care and telecommunications.

Meeting demand

Electronic Data Systems Corp. is another outsourcing vendor that is trying to bring together both systems and network administration skill sets. The company's client/server technology services group, which has 1,300 employees in 30 locations worldwide, this year will hire "hundreds" of systems and network administrators for a two-pronged approach to systems management, says Dan Shubert, director of the group.

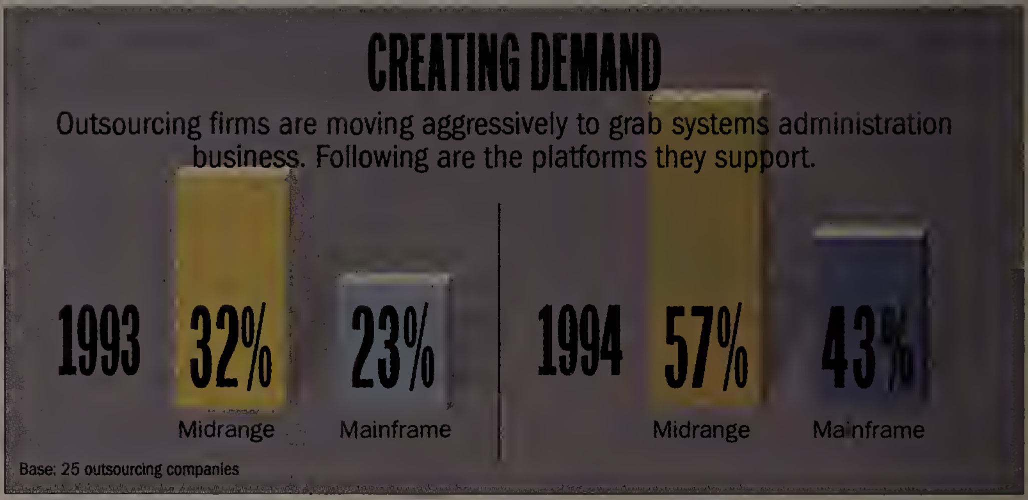
At least one company has experienced so much demand that it has formed a division dedicated to systems administration. Pencom Systems, Inc., an Austin, Texas, outsourcing, recruiting and technical training firm, launched Pencom Systems Administration (PSA) last May to provide specific outsourcing services.

In its first eight months, PSA hired 50 systems administrators to handle outsourcing demand. Ed Taylor, an executive vice president at Pencom who heads the division, says PSA will finish the year with a total of 185 systems administrators.

Taylor notes that while systems administrator salaries are increasing overall — averaging $58,000 a year — they may be slightly lower in outsourcing firms. The real payoff comes in increased career growth and respect, he says.

"Most systems administrators have little career growth in their companies because their function is treated as a cost center environment no matter how good they are," Taylor says. "Here, it's a different story because our company's core competency is systems administration. They have a career and are treated as a profit center, not a cost center." ■

Goff is a freelance writer in New York.


CREATING DEMAND

Outsourcing firms are moving aggressively to grab systems administration business. Following are the platforms they support.

Source: Dataquest Worldwide Services Group, Framingham, Mass.

RHICONSULTING℠
Information Technology Professionals

With one call to *RHI Consulting*, you access premium IT job opportunities. Elevate your career by working in leading-edge positions at the most successful, innovative firms.

RHI Consulting specializes in IT staffing and has developed the contacts necessary to further your career objectives.

And *RHI Consulting* is a division of *Robert Half International Inc.*, the world's first and largest staffing specialist in providing information technology, accounting and financial professionals with more than 175 offices worldwide. Call *RHI Consulting* today!

TECHNICAL OPENINGS FOR COMPUTER PROFESSIONALS

PROGRAMMER/ANALYSTS
- POWERBUILDER/ORACLE or SYBASE
- CA-DATACOM/DB w/IDEAL or COBOL
- DB2/SQL/COBOL
- CICS/COBOL-TELON A PLUS
- LOTUS NOTES
- AS/400/COBOL, RPG or SQL
- X-WINDOWS, MOTIF, PRES. MGR.
- SAP R/2, R/3
- ORACLE V7 FORMS, REPRINTS, FINANCIALS
- UNIX, C, INGRES, ESQL

DATABASE ADMINISTRATORS
- SYBASE
- ORACLE/UNIX or VMS
- CA-DATACOM/DB
- DB2
- INFORMIX
- IMS DB/DC
- UNIDATA/BASIC/PICK

LAN ANALYSTS
- NOVELL, APPLETALK, TOKEN RING
- BANYAN

SYSTEMS SUPPORT
- OS/2 +LAN SERVER/WINDOWS
- VAX SYSTEMS MANAGER
- AIX/UNIX ADMINISTRATORS
- UNIX/SHELL/NFS/
  WORK STATIONS
- CA-7, CA-11, JCL

MANAGEMENT CONSULTANTS
- Client/Server Systems Integration
- Financial Package Implementation
- Legacy Systems Conversion

Phoenix, AZ ....(602) 264-6488
Denver, CO ....(303) 629-1010
Hartford, CT ....(203) 278-7170
Stamford, CT ....(203) 324-3399
Metro Wash. D.C. ....(703) 243-3600
Ft. Lauderdale, FL ....(305) 763-5578
Des Moines, IA ....(515) 244-7060

Chicago, IL ....(312) 616-8200
Boston, MA ....(617) 951-4000
Metro Detroit, MI ....(810) 524-3698
Minneapolis, MN ....(612) 339-9001
St. Louis, MO ....(314) 878-9975
Edison, NJ ....(908) 225-5577
New York, NY ....(212) 687-7878

King of Prussia, PA ....(610) 337-7300
Nashville, TN ....(615) 360-8065
Dallas, TX ....(214) 363-3300
Houston, TX ....(713) 688-9614
Seattle, WA ....(206) 443-8880

©1994 Robert Half International Inc. EOE

Developing Careers
In Developing Technologies

Join Florida's Leader In Consulting, Training and Permanent Placement.

CLIENT/SERVER ENVIRONMENTS
- C • C++ • Visual Basic
- PowerBuilder • Oracle • Informix • Sybase
- Windows NT, MFC/SDK, MS Access
- UNIX • Lotus Notes • PC Express • Data 3

IBM MAINFRAME
- DB2/CICS • IMS DB/DC • COBOL

IBM MIDRANGE
- AS400 RPG

DEC
- VAX COBOL

APPLICATION PACKAGE SOFTWARE
- Arthur Andersen DCS, MACPAC
- SAP MM, FIN • M&D Payroll, HR

OCCUPATIONS
- Object Oriented Analysis & Design & Implementation Experts
- Sr. Programmer/Analysts
- Business Analysis

Microsoft SOLUTION PROVIDER
Authorized Technical Education Center

COMPUTERPEOPLE

Tampa Bay Area
12225 28th Street North
St. Petersburg, FL 33716
800-554-7206 • Fax 813-572-6088

Ft. Lauderdale Area
3265 Meridian Pkwy., Suite 122
Ft. Lauderdale, FL 33331
800-777-8603 • Fax 305-389-0204

Orlando Area
201 E. Pine St., Suite 1305
Orlando, FL 32801
800-299-9953 • Fax 407-843-8153

RADIO FREE EUROPE
RADIO LIBERTY

Director of Information Services

Radio Free Europe/Radio Liberty Inc., a private, non-profit corporation supported by the U.S. Congress, broadcasts in 21 languages to the nearly 400 million people of Central and Eastern Europe and the former Soviet Union.

We are currently moving our broadcasting operations from Munich, Germany to Prague, Czech Republic. With this move, we are introducing digital audio program production and upgrading our international telecommunications and management information systems.

Leading a staff of 25, the Director of Information Services will evaluate, implement, and support the application of new information technology for RFE/RL's broadcasting and administrative needs. Responsibilities include vendor and contractor selection and management; departmental management, budgeting, staffing, and training; and development of policies and procedures.

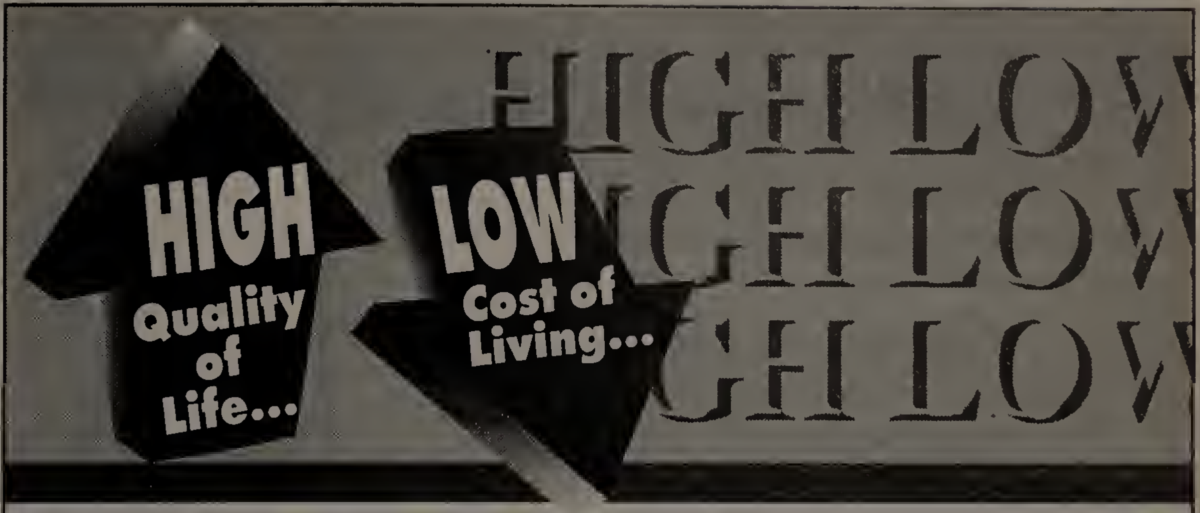
To qualify, candidates must have hands- on experience with client/server systems, large ethernet-based Local Area Networks, and international Wide Area Networks. They must have skills and flexibility to work in a fast-paced international environment and lead a talented staff. Experience in radio or television broadcasting is desirable.

We prefer to base this position in Prague, but we will consider Washington, D.C. location for exceptionally qualified candidates.

For consideration, please send your resume, salary history, references and location preferences, if any, to: RFE/RL, Inc., Personnel (ISD/DIR), 1201 Connecticut Ave., NW, Washington, DC 20036. Fax: (202) 457-6974. Or, RFE/RL, Inc., Box 86 (ISD/DIR), Oettingenstr. 67, 81925 Munich, Germany. Fax: (89) 2102-3404.

Review of applications will begin on 1 February.

RFE/RL is an Equal Opportunity Employer.



If you're ready to raise your quality of life while lowering your cost of living, look to CTG in the Midwest. With 10 offices in key cities throughout the heartland, we offer skilled technical professionals challenging assignments with some of the nation's most prestigious organizations.

Opportunities are currently available in the following areas:

Merrillville, IN - • DB2 • IMS • IDMS/ADSO • IEF • ADABAS/Natural • COBOL

Chicago, IL - • DB2 • IMS DB/DC • IDMS/ADSO • ADABAS/Natural • COBOL • CICS • Oracle

Cincinnati, OH - • IEF • IEW • DB2 • IMS • COBOL • PowerBuilder • Sybase • Oracle • Visual Basic • AS/400

Cleveland, OH - • Lotus Notes • DB2 • CICS • IDMS/ADSO • IMS • COBOL • AS/400 • MOD204

Columbus, OH - • PowerBuilder • Visual Basic • Oracle • Sybase • C, C++ • AS/400 • CASE Tools • Lotus Notes • DB2/CICS • IMS/CICS • UNIX • Client/Server

Detroit, MI - • Oracle DBA • Oracle P/A • DB2 DBA • COBOL, VAX • Systems Programmers • CASE • SQR • DB2, COBOL

Ft. Wayne, IN - • PeopleSoft • DEC Forms • C • OS/2 • GUI • DB2 • CICS

Grand Rapids, MI - • ADABAS/Natural • Oracle CASE • Oracle Forms 4.0 • Oracle DBAs • DB2 • EDI • CICS

Indianapolis, IN - • ADW • SAS • CICS • DB2 • Oracle • AS/400 • IDMS

Milwaukee, WI - • DB2 • CICS • COBOL/II • EDI • IMS DB/DC • INFORMIX • DATALINK • Oracle • Mortgage Banking • PowerBuilder • Visual Basic • SAP/R3

Join CTG in the Midwest and enjoy excellent quality of life, as well as attractive compensation and benefits. For consideration, send your resume, indicating geographic preference, to: **CTG - Midwest Sourcing Center, Dept. CW0109, 8001 Broadway, Ste. 201, Merrillville, IN 46410-5528. Ph.: (219)756-6360 or (800)214-2820. Fax: (800)214-2720.**

For information about opportunities nationwide,
contact the regional sourcing manager nearest you:

Northeast: (315)463-6276 or (800)272-5852/Fax: (315)463-0437
South: (404)263-3400 or (800)788-2159/Fax: (404)263-3434
Central/West: (214)919-1567 or (800)345-7782/Fax: (214)919-1598
Mid-Atlantic: (919)851-9008 or (800)851-6577/Fax: (919)851-1874

ctg

EOE M/F/D/V

Recruit computer professionals in the one newspaper that reaches more **QUALIFIED** professionals than any other newspaper: *Computerworld.*

For more information or to place your advertisement, call **Lisa McGrath at 1-800-343-6474; ext. 201** **(in MA, 508-879-0700).**

Weekly.
Regional.
National.
And it works.

COMPUTERWORLD

Opportunities with SYNTEL

Welcome to SYNTEL, INC., an international leader in the software consulting business with an outstanding track record of growth and profitability. The company provides a range of high-quality software services including systems integration, project management, outsourcing, and has established a reputation of responsiveness and on-time delivery.

We currently have opportunities for Senior Software Professionals at various locations nationwide. The Ideal candidates should be TEAM LEADERS/SENIOR ANALYSTS with at least 10 years' experience.

Expertise with application development in Taxation, Transportation and Insurance is a distinct advantage. The Design/Development environment will include Data Modeling, RDB Design, Client Server Architecture, Networking, IBM Mainframes and IEF-CASE TOOLS, and prior experience on any of these is required.

We also have opportunities for Programmer Analysts with 3-5 years' relevant experience in the above skill sets.

Interested candidates should mail/fax their detailed resumes to:
Recruiting Manager, 5700 Crooks Road, Ste. 301, Troy, MI 48098; Fax: (810)828-3307.

Equal Opportunity Employer M/F/D/V.

SYNTEL

Opportunities in Saudi Arabia

IBM has the following opportunities immediately available for computer professionals in Riyadh, Kingdom of Saudi Arabia:

- Quality Assurance Analyst - Requires ten (10) years of progressively responsible experience in Quality Assurance (QA) in a mainframe computing environment. ISO certification in QA, and degree in Computer Sciences or related discipline. Experience in large banking environments is highly desirable. Knoweldge of Information Engineering methodology a plus. (24 month assignment)
- Executive Information Systems Analyst - Requires five (5) years experience in the design and development of Executive Information Systems (EISs), as well as degree in Computer Sciences or related discipline. Experience in large banking environments il highly desirable: (6-12 month assignment)
- Banking Programmer/Analyst - Requires five (5) years experience in a STRATUS-based banking environment using ATM/POS switch and with ACTION 2000 FT software (12 month assignment)

All positions offer a competitive remuneration package. And if you quality for any of the above positions, please fax your resume in confidence to:

IBM
Attention: Professional Services
fax: 966 1 402-5474
Principals Only

UND AEROSPACE
UNIVERSITY OF NORTH DAKOTA

Director of Scientific Computing Center

Applications and nominations are invited for Director of the Scientific Computing Center of the Center for Aerospace Sciences, University of North Dakota, who would hold a faculty rank in the Department of Computer Science (rank depends on experience).

The University of North Dakota is the largest institution of high education in North Dakota, South Dakota, Montana, Wyoming and western Minnesota. The Center for Aerospace Sciences is the second largest degree granting college at the University of North Dakota, enrolling 2,000 students. The College is made up of four academic departments -Computer Science, Aviation, Atmospheric Sciences and Space Studies, as well as the divisions of Scientific Computing Center, Flight Operations and Distance Learning.

The Scientific Computing Center resources include a supercomputer (Cray), a number of mainframes, minis, and a network of work stations, PCs and Macs. We are seeking a highly motivated individual to provide leadership and to build technical and scientific collaborations and partnerships on a national level. This position requires a Ph.D. in Computer Science or a related field and strong industry or university experience in successfully establishing and overseeing complex technical projects. Besides teaching undergraduate and graduate courses in computer science (one course per semester), most of the responsibilities are related to the overall operations of the Scientific Computing Center which include income-generation by the Center, budget and strategic planning, and raising awareness within the University, State and business community of the potential research activities within the Center; especially in the supercomputer environment.

This is a 12 month, non-tenure track appointment with an anticipated starting date after July 1, 1995. Salary is competitive and commensurate with experience and qualifications. Consideration will begin immediately, and the position will remain open until filled.

Send letter of application, including a statement of personal philosophy concerning the management and direction of a computing center that has a supercomputer, resume, and at least three references to Leon Osborne, Chair of the Search Committee, Center for Aerospace Sciences, Box 9007, Grand Forks, ND 58202-9007.

UND is an Equal Opportunity/Affirmative Action Employer

East

NEW TECHNOLOGIES NOW At Oxford Health Plans

Join a winning team and be part of one of the fastest growing managed care companies in the country. To sustain our stellar growth and maintain a competitive edge, Oxford Health Plans is making significant investments in new technologies. We have numerous opportunities for talented Information Systems professionals in enterprise-wide client server computing, document imaging, text retrieval, and expert systems.

- **DEVELOPERS**
- **PROJECT MANAGERS**

Much of our development work is in an Oracle/UNIX environment using various front-end development and design tools. We are interested in people who get excited about delivering top quality software and seeing it implemented. If you have proven experience in GUI development and relational database technology, if you want to continually learn, and if you would like to apply new skills in one of the most rapidly changing and growing sectors of the U.S. economy, join Oxford Health Plans.

Contact us today and discover just how quickly you can make your mark. At Oxford Health Plans, creativity is encouraged, results are rewarded, and the challenge never ends.

Oxford Health Plans offers an excellent salary and benefits package. Please send your resume to Ginny O'Brien, Human Resources-IS, Oxford Health Plans, 800 Connecticut Avenue, Norwalk, CT 06854. An equal opportunity employer m/f/h/v.

Oxford Health Plans

More than healthcare. HumanCare.℠

HIGHER EDUCATION

A technological leader, Software AG is one of the world's largest independent software developers. To maintain our leading edge, we're taking on the computing challenges of the future.

Join our forward-thinking company as a **Project Manager**. We're seeking individuals to manage the development of student records systems at a variety of locations throughout the central and eastern U.S. Candidates must possess a bachelor's degree in a relevant field and prior project management experience. Familiarity with Software AG products, including Adabas, Natural and Construct, is a plus. Travel is required.

Software AG provides exceptional salaries and benefits. Send or FAX your resume to: Software AG, Human Resources, Dept. MC-130, 11190 Sunrise Valley Drive, Reston, VA 22091. FAX: (703) 391-8340. An equal opportunity employer.

SOFTWARE AG

SOUTHEAST

Work and play in one of the most desirable areas:

beaches • mountains
lower cost of living
year-round golf • lakes

- Client Server
- Mainframe
- Networking

ACP

Salaried • Full Benefits • 401(k)
Referral $

American Computer Professionals, Inc.
P O. Box 11159
Columbia, SC 29211
800-933-9227
Fax: (803) 779-1955
(803) 256-3277
Internet: ACP@SCSN.NET
equal opportunity employer

Programmer Analyst Tampa/temple Terrace, FL. Convert spec. into control and data flow diagrams; Develop design doc. from diagrams; Plan and develop programs using doc and flow diagrams, Prepare test plans to evaluate the functional and logical correctness and reliability of programs. Perform unit and systems tests based on scripts; Write doc. to describe program development, logic, coding and corrections. Evaluate user requests for modification and enhancement of existing programs, Provide customer support incl troubleshooting of software. Inspect detailed/high level design and test script doc of other programmers. Must have: Proof of legal authority to work in US. MS in Computer Science or Ele Eng. or Comp Eng or Systems/Control Eng., 1 yr exp in job offered or as Computer Consultant or Research Associate. At least 1 yr exp in UNIX SVR4 BSD4.3 AIX3.2.5, C LEX YACC, Kornshell & C shell programming, UNIX internals. 6 mths exp in software testing and reliability modeling. 40hrs wk M-F 8-5 $37K/yr. Send resume in duplicate to Job Service of Florida, 2312 Gulf to Bay Blvd., PO Box C Clearwater FL 34618-1090 Re: Job order #FL [illegible]

ATLANTA

Bring your AS/400 skills to Atlanta. Permanent positions to $70K and Contract positions to $45 per hour.

AS/400
- P/A Software 2000
- P/A MARCAM, JOMAR
- Bus Sys Analyst RPG
- Sr Bus Sys Analyst RPG
- P/A COBOL
- Project Leader RPG
- Sr Developer RPG
- Systems Analyst RPG
- P/A PC Support

ProSelect
P.O. Box 72613
Marietta, GA 30007-2613
404-973-2566 fax 578-9586

PROGRAMMER II

Be part of a team programming on the HRMS package (INTEGRAL). Knowledge of DOS/VSE and CICS command level Cobol programming a must. Prior experience w/ICCF and the INTEGRAL package a definite plus. A minimum of 2 yrs. experience required. Starting salary $2,375 $2,594 per month. Send resumes to Palm Bch. Co. Sheriff's Offc., Personnel Bureau, 3228 Gun Club Rd., WPB, FL 33406. Phone: 407-688-3220. Open until filled EOE

COMPUTER PROGRESS UNITED

$40,000 to $60,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available with a National Client in all regions of the U.S.

ORACLE
LOTUS NOTES
DB2 ▪ IMS ▪ CICS

Send resume or call:
Computer Progress United
12730 Townepark Way
Louisville, KY 40243
(502) 245-6533 ▪ FAX (502) 244-5369

Research Technician III Design, develop, and implement software for and supervise application of tasks of rare-gas static mass spectrometer, associated argon extraction systems, incremental heating and gas cleaning systems in the determination of K-Ar and 40Ar/39Ar mineral age, and the analysis and cataloging of data. Must have minimum Bachelor's in Computer Science or Engineering. 1 year computer lab programming and administration experience, be thoroughly familiar with and proficient in use of mass spectrometer, magnet regulator, ratiometer integrating, ion accelerator incremental heating systems, mineral separation facilities, C/C++ Prolog Lisp, Pascal, Geo Chronology Visual Basic, DBASE IV, TCP/IP and Expert system, and present proof of legal authority for full time employment in the U S. Mon.-Fri. 9AM-5PM. $20,455.00 year. Those interested and qualified, send resume or apply in person to GA Dept of Labor, 788 Prince Avenue, Athens, GA 30603-0272 or the nearest Department of Labor Field Service Office Job Order #GA 5810226

SENIOR PROGRAMMER/ANALYST to design, analyze, implement, test and maintain DirectTalk/6000 VRU applications using DirectTalk6000 Graphical User Interfaces (GUI) and the DirectTalk/6000 ASCII editor on an IBM RISC 6000 (320, 340, 520) AIX system, design and develop databases and client/server applications using Informix 4GL, SQL, ESQL and C language on Unix platform and Novell Netware; design and develop custom servers using C language to interface DirectTalk applications with data on host computer running Motif and MS Windows. Require: M S in Computer Science and two years experience in the described job duties or in software systems analysis. Experience must include at least one year (full time or equivalent part time) on IBM RS 6000 with GUI (Motif X-Windows) and VRU applications. Salary $35,883 per year 8:30 am to 5:30 pm, M-F. Apply with resume to Columbia Job Service, P O Box 567, Columbia, SC 29202. Attn: Ms Lisa Hill. Job Order No SC 2000316

SENIOR TECHNICAL CONSULTANT To direct and coordinate projects involving the research, design, and development of computer software systems for the automated data conversion industry, applying principles and techniques of computer science, engineering and math analysis, to direct and coordinate projects involving analysis of software that determines and tracks time and cost. To evaluate interface of hardware and software. To do performance tests on developed software. Requires proficiency in developing using and maintaining software on UNIX X Window System using X-View Motif. Fluency in C, C++ Shell Programming, Unix networking & Relational Databases. Work 40 hours per week, M-F 8-5. One job is available in Charlotte, North Carolina requiring M S in Computer Sci or Computer Eng. Salary $35,000/yr. Send resumes to Job Service, 500 W Trade Street, Charlotte, NC 28202. Resumes MUST include Social Security number. Refer to Job Order No NC2644735

Engineer, Software Technical Analyst. Provide telephone support to customers using dist rel d/b s/w & dev tools on various op sys. & networks. Diagnose problems & reproduce locally to identify s/w or h/w problem. Customize rel d/b s/w for client-server arch. Write tech. rpts. Provide training/present seminars. Must have BSCS or equiv (eg. degree in info. sys.), min 2 yr s/w dev or support exp. (MS degree will substitute for 1 yr of exp.), & academic or equiv bckrnd in op sys. (min Unix shell prgrmming, Windows, OS/2 & Novell), networks (min TCP/IP, SPX/IPX, APPC & NETBIOS), client/server arch, rel d/b, & dist d/b. Must be able to communicate clearly in spoken English. 3 openings $3500/mo. Job/interview: Orlando. Clip ad & send w/resume to Job Service of Florida, 3421 Lawton Rd, Orlando, FL 32803. RE: Job order number FL-1173100

Computer Programmer. Design, write, test & document computer programs & subroutines. Respond to change demands & standards of the insurance industry in general & the organization in particular by updating existing software as needed. Produce accurate application software & insure accuracy & reliability be testing all new & updated software before use in the production envir. Min req inc B S, B A or B S in M I S or C S w 2 yrs exp in above pos and 2 yrs exp as Project Manager or related computer pos w/ability to use the following languages, utilities, hardware & o s: COBOL, APS, EASYTRIEVE PLUS, ASSEMBLY, JCL, SQL, QMF, ABEND-AID, FILE-AID, CICS, PROEDIT, DATAVANTAGE, DB2 TABLES, IMS DATABASES, VSAM DATASETS, EXCELERATOR CASE TOOLS, IBM ES9000 MODEL 952 w TSO ISPF in MVS ESA O S. 40 hr wk, 8:00-4:15, $31,120 yr. Please send resume to TN Dept of Employment Security, 505 Market St, P O Box 11088, Chattanooga, TN 37401, Attn: Mr. Charles Turner. Ref: TN 1637320

Long Term Contracts

- Endevor or Bundl
- PAC/Natural
- Mainframe Cobol P/A's
- IEF or ADW Developers

Contract Skill Sets Corp.

508) 278-2822

Fax (508) 278-3721

Results.

Computerworld gives recruitment advertisers results. Weekly. Regionally. And Nationally.

To place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly.
Regional.
National.
And it works.

An IDG Communications Publication

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you large numbers of professionals who work in your industry.

When you're recruiting computer professionals, it's often important to find ones with experience working on systems specific to your industry. From manufacturing to banking, healthcare to insurance, *Computerworld's* audience of over one half million is made up of the right people in every major industry.

INDUSTRY	COMPUTERWORLD'S AUDIENCE
Information Systems "vendor" companies (includes consulting)	**192,435**
Computer Manufacturer	72,415
large-scale systems	32,186
mid-range systems	51,326
PCs/workstations	47,195
Software Vendor	112,959
for large-scale systems	49,415
for mid-range systems	88,948
for PCs/workstations	50,801
Non-CPU Computer products manufacturer	23,872
VAR/Dealer/Retailer	29,263
contract DP services	53,003
Consulting/Planning	74,686
Information Systems "user" companies and organizations	**462,930**
Manufacturing (not computers)	101,020
Insurance	52,857
Healthcare	53,838
Banking/Financial Services	68,840
Government Federal/State/Local	85,753
Business Service (except DP)	29,586
Communications Systems	28,985
Public Utilities	56,584
Transportation	31,351
Wholesale/Retail Trade	57,868
Education	104,994

SOURCE: Skill Survey of *Computerworld's* Audience, September 1993.

To place your advertisement regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at

800/343-6474
in MA, 508/879-0700

COMPUTERWORLD
Where the qualified candidates look. Every week.

I-CASE ENGINEERS

If you are an I-CASE Engineer looking for a challenging job opportunity with a progressive, nationally known computer services company, then CTA wants you.

To qualify, you must have

- **PhD or Masters in IS or CS or**
- **BS with OEM Certification**
- **Ten years' experience**
- **Full lifecycle experience**
- **Two years' experience in IE process, database modeling and design concepts**
- **Experience on one large I-CASE (50+ entities) or two medium I-CASE (30+ entities) projects**
- **One year experience in I-CASE tool(s)**
- **IEF experience desired, CTA WILL TRAIN IF NECESSARY**

We offer competitive salaries and excellent fringe benefits. Please send or FAX resumes to: CTA INCORPORATED, Box IC, 6116 Executive Boulevard, Rockville, Maryland 20852. FAX # (301) 816-1367. CTA is an EOE.

CTA
INCORPORATED

SOUTHEAST

Join Computer Consulting Group, one of the Southeast's most dynamic consulting firms, and watch your career soar. We are seeking *talented* and *motivated* programmer/analysts and have immediate staff openings through our offices in Richmond, VA; Raleigh and Charlotte, NC; Greenville and Columbia, SC. Our immediate and continuing needs are:

- **Clipper Programmers**
- **Novell Network Specialist**
- **Visual Basic Programmers**
- **Windows Support Spec.**
- **PC/MAC Support Spec.**
- **AS400/RPGIII**
- **Oracle DBA**
- **APS Programmers**
- **IMS Progammers**
- **PC SAS**

CCG offers competitive salaries, attractive benefits, relocation assistance and MORE! For immediate consideration send resume or call NOW!

Computer
Consulting
Group
Contract Professional Services

One Monckton Boulevard
Columbia, SC 29206
1-800-222-1273 • FAX (800) 539-3339
Member NACCB

Network Specialist

ASTM

Scientific/technical publisher ASTM is seeking an experienced network administrator with a range of established skills to install and manage UNIX-based client-server systems. The organization is currently in development of a state of the art application dedicated to supporting authors and editors as they create and publish documents in multiple formats. Additionally the organization is replacing mainframe based core business systems (e.g.: sales; inventory, A/R) with UNIX based client-server solutions. This position offers the potential for growth and participation in the integration of new methods and tools in a dynamic publishing environment. The successful candidate will have a minimum of two years of college in Computer Science, a minimum of three years experience managing UNIX-based client-server systems along with a strong working knowledge of UNIX and TCP/IP. Knowledge of DOS Windows, and Novell Netware is a plus.

Send resumes to ASTM, 1916 Race Street, Philadelphia, PA 19103. Attention William E Yonker Fax# 215-299-2610

MAXIMIZE YOUR OPTIONS

In today's explosive market, your top-notch skills equal outstanding career opportunities. DRACS Consulting Group, Inc. has these opportunities AVAILABLE NOW

- C, C++, SDK or MFC
- Visual C++
- Visual Basic, Access or SQL Server
- PowerBuilder
- Smalltalk
- AIX, C, C++
- AIX, UNIX System Administrators
- Informix, C, 4GL, ESQL
- Sybase
- Oracle
- ACMS, DECFORMS, C
- DB2, CICS, COBOL II
- Telecommunications
- Vantage 1, Life 70
- AS/400, RPG

We offer full time and contract positions with excellent benefits. For consideration, mail or fax a resume or call one of our Technical Recruiters for more information

DRACS Consulting Group, Inc
3343 Peachtree Road, Suite 1230 E
Dept. J 1, Atlanta, GA 30326
(800) 727 1184 • (404) 262-1184
FAX (404) 262 3994

DRACS
CONSULTING GROUP

TAMPA/DALLAS

Opportunities for DP PROFESSIONALS with:

- IDMS/ADSO
- OOP/OOD DESIGNERS
- INTERGRAPH MGE/MDL
- TANDEM/SCOBOL/COBOL
- DB2/TERADATA/IMS DBA'S
- IDEF1X/ERWIN/LEVERAGE
- UNIX/HP-UX/SHELL SCRIPTS
- ACCESS BASIC/WIND/DDE/OLE
- COBOLII/DB2/CICS
- BORLAND & VISUAL C++
- POWERBUILDER/SYBASE
- C & C++/UNIX/XWINDOWS
- DATA MODELING & ADMIN
- INFORMIX & ORACLE DBA'S
- TELEPHONY BIA'S/PROJ MGRS
- HP3000/SFD/DISTRIBUTION/EXP

FOR IMMEDIATE CONSIDERATION CALL SYSLOGIC today at

(800) 797-5644 or
(813) 287-0054
FAX RESUME TO (813) 282-9511

P.O. Box 26146
TAMPA, FL 33623

Software Developers

Let Us Be Your Career Developer.

ORCA Technology has evolved into the Southeast's leading IS/DP search & consulting firm, from start-ups to Fortune 500 full-time career opportunities. To help you start an exciting new career challenge in the new year, we're in an intensive search for:

DIRECTOR, Application Development

Fortune 100 insurance company (Mid-Atlantic area) seeks Director/Division-level Manager to lead 80–100 person m/f applications development/migrations to client-server. Strong development, leadership, and consultant skills required. Also need several Manager-level professionals.

DIRECTOR, WW Manufacturing Systems

Fortune 200 Textile firm (North Carolina) needs Director-level to lead 50–60 person int'l systems team. Heavy manufacturing, project/systems development, leadership, exposure to new technology (open systems) and textile experience desired.

Other multiple opportunities exist for IS/IT pros with any of the following skills in our various NC/SC locations as well as Balt/Wash DC, Atlanta & Tampa areas (no entry-level):

- PowerBuilder
- Gupta SQL
- S.A.P. Consult
- Sybase/Informix DBA's
- Data Modelers
- CAE/CAD/EDM
- Oracle 7.0
- Powerhouse
- Visual Basic, C++, DDE
- PL/1, Cobol/CICS/DB2
- Big "6" Mgrs/Consult
- UNIX Sys. Admin.

Interested candidates can mail/fax resume and cover letter indicating position of interest (with salary req) for immediate consideration to: ORCA Technology, Attn: HR Mgr., 312 W. Trade St., Suite 700, Charlotte, NC 28202; or FAX to (704) 375-1313. EOE.

ORCA Technology & Search

Build Your Career With Us!

Advanced Technology Systems currently has permanent positions available in Charlotte, NC. Qualified individuals will possess at least 1–1 1/2 years of experience with any of the following:

Languages:
- **C/C++**
- **SmallTalk**
- **Power Builder**
- **Visual Basic**
- **Cobol**

Databases:
- **Oracle**
- **Sybase**
- **IMS DB/DC**
- **DB2**

Operating Systems:
- **OS2**
- **UNIX**
- **MVS**

Other Skills:
- **CICS**
- **JCL**
- **APS**
- **IEF**
- **Excellerator**

Other specialty areas include Data Architecture/Modeling, Case Technologies, and Client Server networking communicatons.

ATS offers competitive salaries and excellent fringe benefits. For consideration, please forward resume to: **Advanced Technology Systems, Inc., Suite 2460, 301 S. Tryon Street, Charlotte, NC 28282; FAX (704) 376-7369.** An Equal Opportunity Employer.

ATS
Advanced Technology Systems, Inc.

Consulting

J.D. Edwards & Company

At J.D. Edwards & Company, we design business software solutions for the long-term. It's a commitment to traditional values and new technologies for our customers that include over half of the Fortune 500. Our open systems software and client/server solutions provide our clients with the ability to adapt to continual changes in the business world.

Marketing Consultants

We are seeking Manufacturing & Distribution Marketing Consultants. Responsibilities will include understanding our client's business requirements, executive presentations, setting up demo systems, product/solution demos, responding to RFPs and pre-sale product/solution questions. Requirements include a Bachelor's degree, MBA and APICS certification preferred. Five years progressive experience with a competitive software company preferred. Must have extensive business systems experience and strong presentation skills. The position requires the ability for extensive travel. Successful candidates will have strong vertical market focus in manufacturing/distribution industry.

Manufacturing/ Distribution Consultant

Responsibilities will include providing our clients with effective business solutions while guiding them through implementation of our business applications software. Requirements include a Bachelor's degree in a related field along with CPIM/CIRM certification. Recent hands-on experience with J.D. Edwards software, a background in "Big 6" consulting and/or an MBA degree an added plus. Successful candidates will have 5+ years of industry experience in Material Management in a manufacturing and/or distribution environment, significant DRP/MRP project experience and a good understanding of systems implementation methodology. Familiarity with the AS/400, strong verbal and written communication skills, and flexibility for extensive travel are a must.

Financial Consultant

Responsibilities will include providing our clients with effective business solutions while guiding them through implementation of our business applications software. Requirements include a Bachelor's degree in Accounting or Finance. Recent hands-on experience with J.D. Edwards software, a background in "Big 6" consulting with a CPA or CMA accreditation and/or an MBA degree an added plus. Successful candidates will have 5+ years of industry experience in Accounting Management or Contollership in a manufacturing and/or distribution environment, significant accounting systems implementation experience and a good understanding of GAAP/FASB principles. Familiarity with the AS/400, strong verbal and written communication skills, and flexibility for extensive travel are a must.

J.D. Edwards is committed to providing quality products for our client services and encourages professional growth for our employees. We offer an outstanding compensation and benefits package. For prompt and confidential consideration, please send your resume and salary requirements to:

Leigh Bloom
J.D. Edwards & Company
201 Merritt 7, Norwalk, CT 06851
No phone calls or agencies please. • EOE

JDEdwards®
SOFTWARE FOR A CHANGING WORLD™

Software Architects, Inc.

INFORMATION SYSTEMS DEVELOPMENT

Are you looking for a consulting firm that provides opportunity for growth, visibility and mobility? At Software Architects, we invest in our full-time, permanent consultants by providing ongoing training to keep them abreast of the latest technologies. We take pride in developing our management and technical staff internally and recruiting top college graduates from across the country.

We're a 16 year old information services firm with branch offices located in Chicago, Columbus, Dallas and Minneapolis. We've recently expanded and opened a new office in Tampa/St. Petersburg and are looking for highly motivated individuals to join our growing staff of high-caliber Information Technology Consultants.

Immediate and ongoing needs exist in all of our branch offices for professionals with expertise in any of the following areas:

COBOL • CICS • DB2 • VSAM • UNIX • C/C++
POWERBUILDER • SYBASE • XWINDOWS • MOTIF
VISUAL BASIC • IEF • ORACLE • MICROFOCUS

We provide a competitive compensation plan and full benefits that include health/dental/life insurance, profit sharing, 401(k) plan and tuition reimbursement. For confidential consideration please mail/fax resume to: Bill Tanca, Software Architects, Inc., 8875 Hidden River Parkway, Lakeview Building, Suite 300, Tampa, FL 33637 Fax: 813-975-7229. EOE.

Chicago • Columbus • Dallas • Minneapolis • Tampa

Computer/Info Systems

Systems Opportunities

WILLIAM M. MERCER, INCORPORATED, is the world's largest consulting firm in the areas of employee benefits and compensation. Its local division, **MERCER TECHNOLOGIES**, provides technology-based solutions to **MERCER'S** worldwide consulting staff and to its business clients.

Our Information Systems Team is expanding to meet business needs utilizing client server architecture to compliment our leading-edge technology. We have the following current openings:

UNIX SYSTEMS ADMINISTRATOR

Primary responsibilities will be to configure, set-up and install HP systems and workstations, network integration between HP systems and IBM and LAN systems, installation, maintenance and support of operating system software, and technical consulting with various internal application development groups.

SYBASE DATA BASE ADMINISTRATOR

Primary responsibilities will be to install, maintain and support Sybase data base software and associated products, assist in performance review and tuning of applications, documentation and implementation of changes to the Sybase environment, development of standards, and the development of disaster and data base recovery plans for Sybase production and test data bases.

MERCER TECHNOLOGIES offers a competitive salary and benefit package and is conveniently located in the northern suburbs (just off the TRISTATE Tollway). Qualified candidates should forward their resume, including salary expectations, to:

Karen S. Pearson, H/R Dept.
MERCER TECHNOLOGIES
1417 Lake Cook Road,
Deerfield, IL 60015-5231
An Equal Opportunity Employer

MERCER
TECHNOLOGIES
AHEAD OF
THE CURVE

SYSTEMS ANALYST

We are seeking a dynamic project manager who can deliver solid and timely solutions, primarily within the framework of a large PC/LAN environment. You need to be a well-versed generalist who can formulate and implement concepts which effectively bring together business needs and technology. If you are organized, driven to succeed, and you possess excellent analytical and communications skills then this may be the position for you.

Conseco offers competitive salaries, and excellent benefits. For prompt attention, please send your resume and cover letter to: **Human Resources Department, Conseco, 11815 N. Pennsylvania St., Carmel, IN 46032.** We're proud to be an Equal Opportunity Employer.

Conseco

Sr CAD-CAM Systems Analyst (Warsaw, IN) - Provide tech support for all CAD/CAM users in scientific/engineering, R&D, manufacturing, marktg & bus. environmt, administer, maintain progrmg & software applics. incl. CADDS, CAD-PACK, CAD Translators, ProEngineer, Unigraphics, Personal Designer, Cadkey & Autocad, perform systems & hardware instals., perform maintenance & diagnostics for all work stations; manage engineering database & document control data, perform SQL database design; build graphical user interfaces; resp. for user training prgrms & manuals, troubleshoot systems, conversions, implmtn & end user problems; consult w/dept. manager & vendors to recommend optimum hardware configrtn for upgrades, manage Ethernet Network Admin. BS in Comp Sci + 2-yrs exp in job offered or 2-yrs as Systems Anal./Progrmr. All exp in CAD CAM systems environ. 40 hrs/wk, 9-5, $39,500/yr. Send resume with S.S. #s to Indiana Dept. of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46204-2277, Attn. Gene R. Replogle I.D.#3379416

Senior System Analyst; 40 hours per week; 8:00 a.m. - 5:00 p.m.; $38,500/year; Overtime as needed. Job duties: To design and develop real time computer integrated expert systems using artificial intelligence and networking technology on UNIX and DEC platforms. Education and Experience Requirements: Master degree in Arts/Science with major field of study Computer Science. Job also requires: 1) 2.5 years working experience in ARCnet environment. 2) 1 graduate level course in real time language; 3) 2 graduate level courses in artificial intelligence; 4) 1 graduate level course in Expert Systems. Qualified applicants should send resume and verification of requirements to: 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202. Reference No. 23295. This is an Employer Paid Ad.

Results.

Computerworld gives recruitment advertisers results. Weekly. Regionally. And Nationally.

To place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

**Weekly.
Regional.
National.
And it works.**

An IDG Communications Publication

Now you can access I.S. careers on a regional on-line database for the Southwest!

See jobs from:

**Cutler/Williams
Dell Computer Corporation
EDS
and many more companies!**

COMPUTERWORLD

For questions about using the service to access jobs, call our information line at 1-800-343-6474, x524.

For information about posting jobs to the service, call F. Jay Savell at 1-800-343-6474, x184.

This service is available at no cost to job seekers. (Callers outside of Texas incur the cost of their telephone call.)

25 YEARS OF SERVICE 1969-1994

DST SYSTEMS INC.

DST Systems, Inc. is the nation's largest information processor for the financial services industry. Employing over 5,000 associates including 1,000 in DP, DST designs, develops and operates proprietary software systems to provide shareholder information to the mutual fund, insurance and banking industries.

PROGRAMMER ANALYST

RESPONSIBILITIES

- Work with the most functionally rich shareholder accounting and information system in the industry
- Respond to client's needs with data conversions, ad hoc reporting and system maintenance and enhancements
- Interact with client liaisons and other DST associates

QUALIFICATIONS

- 2+ years work experience with COBOL and CICS in an IBM/MVS environment
- DB2, Datacom or other relational data base experience a plus
- Excellent communication skills

ARCHITECTURE MANAGER

RESPONSIBILITIES

- Manage staff of 30+ persons engaged in large-scale architectural development
- Building architectures including process, data and technology architectures (across and within platforms)
- Performance tuning for large volumes (wall-clock and CPU)
- Reengineering a very large system to new technologies

QUALIFICATIONS

- 2+ years experience managing at least 10 persons
- 7-10 years DP experience in an IBM mainframe environment (CICS and DB2 a definite plus)
- Strong project management and communication skills
- Experience in large OLTP design (5-10MM rows, 100K transactions/day)
- Experience in large-scale development in a complex multi-client environment

Contact us by phone, fax or letter:

DST™

DST Systems, Inc.
Technical Recruiters
1004 Baltimore • 9th floor
Kansas City, MO 64105

Phone:
1-800-874-0174
Fax:
(816) 435-8618

New Mexico State University's Computing....

.....and Networking Technology Organization (CANTO) is seeking candidates for a Lead Systems Programmer to install, maintain, and provide technical support of the University's DB2 database system(s). Salary: $45k-55k/yr, DOE. Requirements are a Bachelor's degree with emphasis in computer science or related field and 8 years experience with large-scale computer operating systems (MVS preferred) with at least 2 years of DB2 support. Application Deadline. 2/15/95 or until filled. Submit resume to Richard Waugh, Box 30001, Dept 3AT, Las Cruces, NM 88003. NMSU is an EEO/AA employer.

CONSULTANTS

- All Technologies
- Nationwide Openings
- Salaried or Project Basis
- 2+ Years Experience

Send/Fax resume to:
Analysts International Corp.
P.O. Box 39612
Minneapolis, MN 55439
Fax (612) 897-4693

CONSULTANTS SHOULD CONSULT

MIMI

IMMEDIATE CONTRACTS

Please send resume & call
Mimi Simon Assoc.
90 West St., Suite 1105, NYC 10006
(212) 406-1705
FAX (212) 406-1768

•POSITIONS AVAILABLE•

Salt Lake City, Utah

Utah offers great skiing, backpacking, water sports, National Parks, an excellent family environment, social opportunities and affordable living.

American Stores Company is one of the nation's largest retail grocery/drug chains, operating stores in 27 states as Lucky, Acme, Jewel, Sav-on, Osco, and Price Advantage. The migration of our Systems Development Center to Salt Lake City has created career opportunities for qualified individuals with a minimum of 2-3 years' experience. Application experience in retail, warehousing, transportation, inventory, or finance is required for most positions.

PROGRAMMER ANALYSTS

All levels on multiple platforms. IBM MF: CICS, IMS DB/DC, DB2, COBOL, COBOLII, VSAM. UNIX: C, SQL, GUI. AS400: COBOL/400, OS/400. POS: NCR, ICL, IBM 4690. Senior positions with strong MF utilities, software Installs, & vendor coordination. (Job# CW-0130-PA)

DBAs/ SYSTEM ARCHITECTS

DB2/SQL, UNIX/DBD, IMS DB/DC, CICS, VSAM, QMF, Informix, Data Administration, and Data Modeling in a retail environment. (Job# CW-0130-DBA)

BUSINESS SYSTEMS ANALYSTS

IBM MF and or Client/Server Platforms with structured analysis, design, test, implementation. End-user experience with training, cost benefit/ROI studies. Warehouse/Distribution/Logistics systems experience required for some positions. (Job# CW-0130-BSA)

SYSTEM ANALYSTS

Either solid IBM MF skills with ISPF Dialog Manager, CA Scheduler, EDI, Gentran or LAN (Novell, Banyon Vines, TCP/IP, UNIX, SQL, C, SDLC, API, Visual Basic, MS ACCESS. (Job# CW-0130-SA)

In addition to an attractive compensation & benefits package, we offer a rare ground floor opportunity to join an established, growing company. To apply, please send/fax resume & salary requirements with a cover letter detailing your knowledge and experience to:

AMERICAN STORES COMPANY

American Stores Company
Attention: Job# ___
BOX 999 Pleasanton, CA 94566-9998
FAX: (510) 833-6497

Equal Opportunity Employer

Lucky • Acme • Jewel • Sav-On • Osco • Price Advantage

Portland • Columbus • Cleveland • Cincinnati • New York • New Jersey •

Columbus • Cleveland • Cincinnati • New York • New Jersey • Seattle • Portland • Columbus • Cleveland • Cincinnati • New York • New Jersey • Seattle • Portland

Claremont Technology Group, Inc., a leading systems integrator and professional services organization, is seeking experienced professionals who are skilled in today's technology. The Advanced Technology Group focuses on projects using the latest client/server tools. We have a world class team of software professionals working with tools such as Powerbuilder, Sybase, Oracle, SQL Windows, C, C++, Smalltalk, Visual Basic, SQL Server, Lotus Notes, and a wide variety of operating systems, hardware platforms, and modeling tools.

ADVANCED TECHNOLOGY CONSULTANTS

We have immediate needs for motivated professionals who understand how to build and deploy client/server systems, work in a team environment, and have a desire to be part of a growing organization.

Requirements include:

- Excellent written and verbal communication skills
- Ability to develop/mentor other Claremont staff
- Ability to assist in new business/ proposals development
- Professional and community involvement
- Technical expertise, industry and/or functional specialization
- Ability to understand and provide excellent client service
- System development experience (analysis/design/programming)

Claremont offers careers, not contracts. Our professional development programs include mentorship, career planning, professional education and development programs. Claremont values a balance between personal and family needs, professional growth and company interests.

Benefits include 401(k) plan, fully paid medical, dental, and vision insurance for employees and their dependents, stock option program, and competitive compensation. If you are a highly motivated person looking for rewarding employment, send a synopsis describing how your skills align with these requirements along with your resume to:

claremont
Technology Group, Inc.

Claremont Technology Group, Inc.
1600 N.W. Compton Drive
Beaverton, OR 97006
fax (503) 690-4004

Indicate Geographical Preference.

Claremont is an Equal Opportunity Employer.

SENIOR ASTECH CONSULTANT

Responsible for providing technical support to customers. Resolve customer problems as required, provides on site technical support; research problems and issues on behalf of customer, maintain customer's computer systems; reviews customer support requirements and provides solutions, analyze customer reported problems, perform support for customer requests while on site, operate customer computer systems and support equipment as required by customer, write status reports to management and customers. travel to customer sites as required. Proven experience in Tandem utilizing Pascal, C, Cobol, Scobol and Assembly programming language software analysis and design; software programming skills, BASE24 products. Testing procedures skills. WordPerfect and database management. Must have B.S. B.A. in Computer Science. 10 hour week. $51,829.00 year. Must have proof of legal authority to work in the United States. Send your resume to Bernard Childerston, Nebraska Department of Labor, PO Box 91600, Lincoln NE 68509. Refer to Job Order #NE 0129918. This advertisement is paid for by the employer.

Mainframe & Cross Platform Opportunities
(positions located Nationally)

~Develop & Support DB2 Performance Monitors or DB2 DBA utilities Req'd. BAL & MVS internals(desired C++ APPC TCPIP) up to 90k
~Dev System Application Tools C/BAL VSAM LU6.2 MVS 100k
~Dev a "NEW" IMS Performance Monitor BAL/C SMPE MVS 110k
~Dev a Netview Monitor C/BAL MVS VTAM NCP(C++ & GUI) 80k
~Dev Telecommunication utilities C/BAL CICS MVS/OS2 80k
~Dev Storage Mgmt Products BAL/C MVS UNIX SMPE 80k
~Dev RDB Network Protocol C/BAL MVS internals LU6 2 VTAM 80k
~Director of Marketing(Storage MF/clientserver)sales, prod mgmt etc
~Product Marketing Managers for applications, database admin & system utilities. MVS VM UNIX VTAM DB2 ORACLE etc. .dev prod launches, client relations, technical savvy, sales etc. packages 200k
~Project Manager(lead 4 dev's) BAL MVS VSAM 90k
~CICS Support (dump read) BAL MVS OS2 VTAM LAN 75k
~System Engineer-Database Conversion DB2 Sybase MVSUNIX 70k
~DB2/MVS product support(1st & 2nd level) Unix desired 70k
~DB2 DBA-Systems & Applic-Sybase or Oracle Unix desired 80k
~Technical Writers Develop software user manuals BookmasterMVS OS2 50k//Ventura Publisher/Corel Draw 54k//Framemaker OS2 50k
~SE(presales)with 2 RDB's MF & Client Server (datawarehousing+)

Submit resumes to: Tina Costa of Mason Concepts, Inc.
6380 Wilshire Blvd., Suite 1000
Los Angeles, Ca 90048
213-655-7555 Fax 213-658-1547
out of California 800-935-1555 masoncon@netcom.com

MASON CONCEPTS INCORPORATED

CIO/EVP

Our client has retained Bill Young & Associates to identify an industry expert to manage their existing and future proprietary shrink-wrapped software releases.

- The candidate of choice will possess a proven track record in planning, developing and managing software product development in a complex client server environment.
- A major plus is demographics software expertise.

Please call in confidence to:

BYA
THE HIGH-TECH HIRING SOLUTION

William Young
Bill Young & Associates
8550 Arlington Blvd., Suite 202
Fairfax, VA 22031
Phone: 703/573-0200 • FAX: 703/573-3612

PRODATA INC.

Portland, OR
Salt Lake City, UT

As One of the West's premier IS Consulting Service firms, We Offer:

• Career Growth • Excellent Compensation • Loaded Perks • Continuing Education • The Challenge of Diversity • Fortune 500 Clientele • Outstanding "Quality of Life" • A Decade of Sustained Growth • Relocation Assistance

We Need:

INFORMIX (incl. DBA's), Powerbuilder, Visualbasic, Visual C, Sybase, Oracle Tools, DB2/CICS, Cobol, IDMS/ADSO, HURON, SYNON, LOTUS NOTES, UNIX, IEF/5.3,C/C++/UNIX...
also...
"Hands-on" Project Managers w/ proven, formal "Fixed Fee" or "Not to Exceed" responsibilities

PRODATA
4800 S.W. Macadam
Suite 309
Portland, OR 97201
(PH) 503 223 3S08
FAX 503 223 7918

PRODATA
1100 E. 6600 S.
Suite 200
Salt Lake City, UT 84121
(PH) 801 266-6138
FAX 801-266-0069

SOFTWARE VENDOR POSITIONS

Salaries to $100,000+

DB2 DEVELOPER - Requires in depth DB2 knowledge & C coding
Developers - Requires strong ALC and system level software exp.
Product Support - Requires good DB2 or VTAM or CICS and ALC
VTAM QA - VTAM/NCP, LAN & Routers
UNIX, OOD Developers - C, C++ and GUI or RDBMS experience

APPLICATION DEVELOPMENT POSITIONS

LIFE INSURANCE - P/A with ALC	To $60,000
SYSTEMS PROGRAMMERS - DB2, MVS, VSE/VM VTAM	To $55,000
DBA's - SYBASE, ORACLE, DB2 or IDMS	$$ OPEN
P/A, CICS or DB2 or IMS - Lots of openings	To $50,000
AS400 P/A - Numerous U.S. openings. Cobol or RPG	To $50,000
Property & Casualty - Insurance Consultants	To $55,000
EDP Auditors - Degree, CISA or CPA a plus	To $60,000
SAP Consultants - 6 plus months SAP, R3 preferred	$$$ OPEN

ROBERT SHIELDS & ASSOCIATES
PO Box 8907234 • Houston, TX 77289-0723
713/488-7961 • Fax 713/486-1496

Associate Research Scientist

The Center for Computer Aided Design seeks an Associate Research Scientist to provide technical leadership in design, implementation, and management of research and applications in system integration and software production process for multidisciplinary simulation based concurrent engineering. Applicants must have a Ph.D. degree in Computer Science, or an equivalent combination of education and experience, with specialization in object-oriented programming languages/systems, software engineering, system design and analysis, and database design. Experience in designing and implementing large scale CAE tools on distributed X-windows/Motif based UNIX environment, and knowledge and experience of structural analysis and design, and design sensitivity for simulation based concurrent engineering are required. Experience in advanced object-oriented environments/languages, computer aided software engineering tools, and scientific database design are also required. Experience with commercial finite element analysis and optimization tools are strongly desirable. Salary is based on qualifications and experience.

Send resume and three letters of reference to Prof K. K. Choi, Deputy Director, Center for Computer Aided Design, The University of Iowa, 426 IATL, Iowa City, Iowa 52242.

The University of Iowa is an Equal Opportunity/Affirmative Action Employer. Women and ethnic minorities are encouraged to apply.

JD Edwards Consultants & Programmers

We have requirements for the JD Edwards Financial & Distribution Software skills to work in United Kingdom & Europe as software implementors or programmers for short or long contracts. The candidate must have minimum 3 years of implementation and/or programming experience of the above applications.

Please call or send resume to:

The Recruitment Officer
Business Technology Consultants Ltd.
Masons House, 1 Valley Drive, Kingsbury
London NW9 9NG England
Tel: +44-81-206-1665 • Fax: +44-81-204-9782

Programmer/Analyst - Boca Raton, FL. Install, configure, support & maintain applications, modify & enhance programs. Utilize IBM PC's, IBM mainframes & compatibles; OS/2 1.0, Turbo C Compiler. Bachelors/Computer Science or Electrical Engineering 1 yr/exp. in job offered or 1 yr as Teaching/Research Assistant and/or Consultant and/or Systems Analyst. Related occupation must include 3 months experience using Turbo C Compiler, OS/2 1.0, IBM PC's, IBM mainframes & compatibles (may be concurrent). 40hrs/wk (8-5) $32,500/yr Send resume to: Job Service of Florida, 2660 W Oakland Park Boulevard, Ft. Lauderdale, FL 33311-1347. Re: Job Order # FL-1169498.

TANDEM
COBOL, PATHWAY,TAL, SCOBOL,C, SQL,X.25
STRATUS
PL1,COBOL,C,ON/2
MUMPS UNIX
SUN, HP, RS/6000, GUI, SDK Powerbuilder, C++, Visual Basic
Fulltime/Consulting Positions available in the US/ABROAD
STRATEM
800-582-JOBS
TEL (212)967-2910
FAX (212)967-4205
124 W. 30th St. Suite #302
New York, N.Y.10001

Computerworld recruitment advertising works!

That's because more computer professionals read more recruitment advertisements in *Computerworld* than in any other newspaper.

For more information or to place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly. Regional. National. And it works.

An IDG Communications Publication

Are you Object Oriented and Career Minded?

Senior Level Project Managers with strong experience in Object Oriented Open Systems Technology needed to facilitate the expansion of a quality driven Systems Integration business.

Positions available in Tampa Florida, Austin Texas, New York City, Los Angeles California, Boulder Colorado, Washington D.C., and other locations by Client requirements:

Excellent Benefits and Salary commensurate with experience. Relocation assistance provided.

For consideration, mail or FAX resume to:

Business Partners, Inc.
Attn: OO/JJ, 1531 N. Dale Mabry Hwy., Suite 102, Lutz, FL 33549. FAX (813) 948-1450.
An Equal Opportunity Employer.

Computerworld recruitment advertising works!

That's because more computer professionals read more recruitment advertisements in *Computerworld* than in any other newspaper.

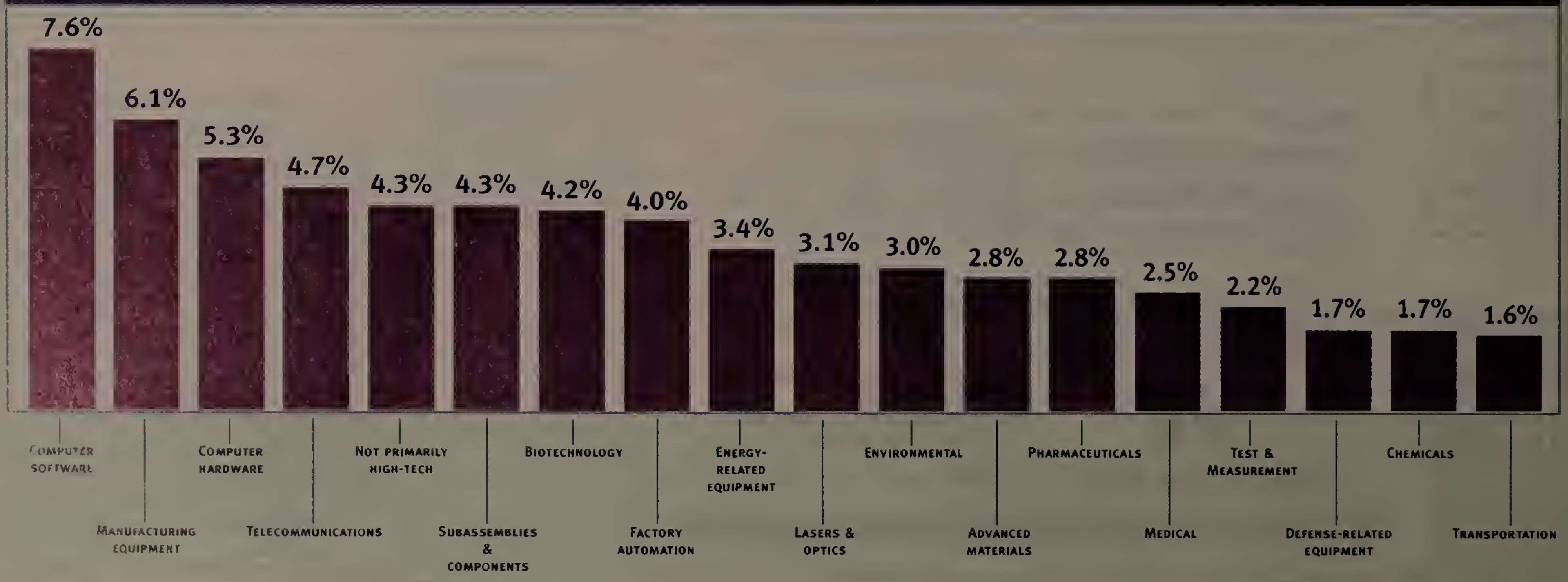
For more information or to place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly. Regional. National. And it works.

An IDG Communications Publication

Computerworld/Corptech Career Index

Projected percent change in number of employees over next twelve months



© Copyright 199[illegible] Corporate Technology Information Services, Inc., Woburn, Mass

Cincinnati/Kansas City/Indianapolis/Phoenix/Louisville

Minneapolis/Lexington/Dayton/Terre Haute

Ft. Wayne/Columbus/Tuscon/Topeka/Wichita

SSI's Growth is Explosive (New branches are opening)

SSI's TOTAL commitment to "Customer and Employee Satisfaction" is making the difference with over 35 percent growth in the last year.

SSI's Customers have many more challenges that include over 100 career positions or openings in Indianapolis, Cincinnati, Louisville, Kansas City, and Phoenix branch offices with one or more of the following disciplines:

- Excellent Analyst/Programmers with good business acumen (SAS, IDMS, CICS, DB2, IMS)
- Relational Database Technologists (Sybase, ORACLE, Informix, MS-ACCESS)
- Business Process Re-engineers (ADW)
- Mainframe to Client Server Experts
- Managers of Outsourced Projects
- Graphical User Interface Experts (Powerbuilder, Object View, Gupta, etc.)

SSI is growing due to continuous employee participation, excellent benefits, and competitive compensation plans. Develop and reward yourself with a career based upon your performance - join a vibrant, aggressive team on the road to success! CALL or RUSH your resume to:

J. W. Burks
Senior Corporate Recruiter
Software Synergy, Inc.
P. O. Box 509285
Indianapolis, IN 46250-9285
FAX (317) 576-6931

SSI

Equal Opportunity Employer

Looking For A Window Of Opportunity?

Technology Consulting, Inc. is a dynamic and rapidly growing Software Development Firm with challenging assignments. We are a leader in application outsourcing. Current client projects and our regional development center require the following skills:

CLIENTSERVER
C,C++, Smalltalk, Visual Basic/C++, MS/Access, Oracle, SQL*FORMS, Sybase, Powerbuilder, Windows SDK NT, Foxpro

AS/400
RPG/400, COBOL

MAINFRAME
COBOL, CICS, IMS DB/DC, DB2, Natural, Construct, INFORMIX, EDI, UNISYS, TIP/DMS, Honeywell, SQL/DS, VM

Arthur Andersen's DCS Package
Certified Netware Engineer/Administrator

TCI offers competitive salaries, attractive benefits, and relocation assistance. For consideration, send resume or call: **502-589-3110.**

TCI TECHNOLOGY CONSULTING INC.

1800 Meidinger Tower, Louisville, KY 40202 FAX. 502-589-3107

IEF

- BAA-Construction, MF & C/S, GUI -

- Development Coordination -

Established in 1971, we are a TI alliance and have open positions with existing clients in various U.S. locations with start dates in Jan. and Feb. '95.

Please fax resume and/or call immediately.

PERFORMANCE DEVELOPMENT CORP.
Phone (800) 828-8615
Fax (214) 644-2330

Programmer Analysts/ Systems Analysts

We are currently looking for **Senior** professionals with experience in building applications that support quality, productivity, and reusability. Positions include:

Portland, Oregon

Sr. Systems Analyst/Systems Ananlysts
Programmer Analysts
Database Administrator
Operations Analyst

Raleigh, North Carolina

Sr. Systems Analyst

Kaiser Permanente InterRegional Common Systems, develops and implements applications and provides on-going support for 10 Kaiser Regions throughout the U.S. Our group supports centralized common business practices, in-house development, and enhanced vendor packages to meet rapidly changing needs within the health care environment. We are building IEF applications for new development and are using Visual Basic for front-end GUIs on legacy systems.

Our methodology includes: data models, data flow diagrams, structure charts, and other structured approaches to develop and maintain applications.

Technical environment includes: IBM 3090, ESA, IEF CASE, COBOL II, CICS, Visual Basic, DB2, CSP, Novell network.

Applications experience desired for, but not limited to, the following areas: Membership Accounting, Claims & Referrals, Patient Accounting, Benefits Administration, Appointment Scheduling, Patient Services, Human Resources/Payroll, and Financial Systems. Demonstrated analytical and communication skills essential.

We offer a competitive salary and benefits package. Qualified candidates should send resume to **Administration, Kaiser Permanente, InterRegional Common Systems, 4900 S.W. Meadows Road, Suite 300, Lake Oswego, OR 97035. FAX: (503) 635-1349.** Equal Opportunity Employer, M/F/D/V.

Trademarks are registered to their respective companies.

KAISER PERMANENTE
The Health Caring People

Analyst/Programmer

IBM RS6000
Mac/PC LAN

Washington, DC health care organization seeks energetic & creative systems analyst/programmer for IBM RS6000 UNIX minicomputer & networked Mac/PC workstations. Must be comfortable with IBM/AIX, BBX Progression/4 database software development, Mac/OS, MS-DOS & Windows, network software for PCs & Macs. Duties include troubleshooting, utility development, systems management, database development, maintenance and administration. Experience in desktop publishing, BBS development, systems integration preferred. Interest in emerging technologies, interactive TV a plus. Competitive salary, generous benefits, nonsmoking office. Send cover letter, resume, and salary requirements to: P.O. Box 15241, Washington, DC 20003-5241.

Join one of the nation's most prestigious companies in one of the nation's most liveable cities.

As the leader in Imaging, Eastman Kodak Company offers one of the most advanced technical environments you'll ever experience. And you'll find Rochester can offer advantages that are equally as impressive – affordable housing, top schools, easy commutes and great cultural/recreational activities. We invite you to discover both the personal and professional rewards of working for Eastman Kodak Company.

SOFTWARE ENGINEERS
SOFTWARE QUALITY ENGINEERS

Product areas:

- **Photo CD**
- **Large Volume Optical Disk Storage Systems**
- **PostScript Printers/RIPS**
- **Photofinishing & Photographic Equipment**

Required experience:

- **C/C++**
- **Object Oriented**
- **GUI (Motif)**
- **UNIX/Mac/MS Windows/Windows NT**
- **Software Product Development**
- **Real-Time Machine Control Applications**
- **Test Engineering & Software Quality Processes**
- **Database Design/Development (FoxPro, Sybase)**

A minimum BS degree (or equivalent experience) and 3-5 years product development experience is required. All positions would require relocation to Rochester, N.Y.

Kodak provides a liberal benefits package including relocation aid. Qualified candidates are invited to mail or fax resumes with salary requirements to: **Eastman Kodak Company, Attn: Professional Staffing, Dept. SWE/CW5, 343 State Street, Rochester, N.Y. 14650-1139. FAX: 716/724-9416.** Eastman Kodak is an equal opportunity employer. We invite people with disabilities to notify us of their need for accommodations. U.S.citizenship/permanent residency required.

Kodak

© Eastman Kodak Company 1995

ENGINEER. Software Support III. Provide senior-level tech support for IC simulation s/w products to customers & field personnel; provide consultation on methodology usage of products & IC design process flow to customers; resolve complex tech problems incl test case generation, research & eval of potential solutions; participate in cross-product problem solving & intra- and inter-group environments; develop, use & share support tools & troubleshooting techniques; provide tech review for new & updated product documentation & training material; provide input to support & engineering mgmt re long range support planning & new product impact; provide direction to less experienced team members. $54,000/year, 40 hrs/wk. Req B.S. in EE, CE, CS or equiv. Min 5 yrs exp in s/w support or IC design engineering. Exp must include IC-design simulation & modeling tech support w/ applications & systems calibration between switch, adept & SPICE models; mixed model simulation; delay simulation; utilization of Lsim, VHDLsim, GDT, DA2UPR, EDIF2UPR, Led2DA & LsimNet tools; proficiency w/ Sun workstations, C & UNIX. Place of employment and interview: Wilsonville, OR. If offered employment must show equal right to work permanently in the U.S. Cut ad and send with resume to: Attn: Job Order #5550864, 875 Union Street N.E., Room #201, Salem, OR 97311. The company is an equal opportunity employer & fully supports affirmative action practice.

STATE OF MAINE
DATA PROCESSING CAREER OPPORTUNITIES

Database Analyst (088200) $30,534.00 - $41,912.00/yearly
Senior Database Analyst (088300) $32,635.00 - $44,282.00 yearly

The State of Maine is accepting applications for anticipated vacancies within the Bureau of Information Services in Augusta, Maine.

Database Analyst - This position is responsible for designing, implementing, and maintaining databases with respect to JCL, access methods, access time, device allocation, validation checks, reorganizations and statistical methods. Preference will be given to applicants with expertise in DB2, Oracle and/or Progress. To qualify, your background must include five (5) years of progressively responsible and complex experience in computer programming, analysis, and design with at least two (2) years in database analysis, design, maintenance, and tuning.

Senior Database Analyst - This position is responsible for designing, implementing and maintaining complex databases, monitoring databas performance, projecting long range requirements, and serving as a consultant and technical resource to other staff. Preference will be given to applicants with substantial experience with DB2 and/or Oracle. To qualify, your background must include eight (8) years of progressively responsible and complex Programming, analysis, and design experience with at least four (4) years in database analysis, design, maintenance and tuning.

Completed applications and supplemental qualifications must be received by the Bureau of Human Resources by 5:00 p.m. February 24, 1995. Applications, employment opportunity bulletins, and supplemental qualification sheets are available at all Maine Job Service Offices or by contacting:

State of Maine
Bureau of Human Resources
State House Station #4
Augusta, Maine 04333-0004
(207) 287-4421

AN EEO/AA EMPLOYER M/F/H

The Monster Board™

Jobs On The Internet

More than 500 people a day view these Hot Jobs on our interactive, easy to find Web pages.

- Multi-media Specialists
- Client/Server Developers
- Database Administrators
- Programmer/Analysts
- Senior Product Support Engineers
- Network Administrators

These jobs are just a sampling of opportunities on the board.

Apply On-Line

Your Source For 100's Of Jobs

Key in: http://www.monster.com

To post jobs call: (508) 653-7666

PROGRAMMER ANALYST (2 openings) (Ref: 16794) consult with clients to determine the business requirements & use technical expertise to provide solutions to client's needs, analyze systems & build comprehensive models, design, develop & test software for client's business; analyze & design applications using Structured Analysis & Structured Design Methodology (SASDM) with StP/SE(Software Through Pictures/Structured Environment) CASE tool; analyze & design object oriented systems using Object Modeling Technique(OMT) Methodology with StP/OMT CASE tool, develop applications on Sun & EP-9000 workstations & PC/ATs in client/server environment using SunOS4.1.3. Hp-UX 9 0. SCO UNIX, C++, C, OSF/MOTIF 1.2, OpenLook 3.0, XView 3.0, Xlib, Oracle 7 0, Ingres 6.4, Windows4GL, & Objectcenter; develop Graphical User Interfaces using devguide. object Builder and Windows 4GL on Sun workstation; develop object oriented applications on Sun workstations in C++, Object Interface (OI) & Xlib; develop Graphical User Interfaces using ObjectBuilder & OSF/MOTIF 1.2; analyze applications to retrieve flow control and program structure & measure cpmplexity using McCabe's Battlemap Analysis Tool & Analysis of Complexity Tool; documenting applications using Wordperfect 6.0 & MS-Excel 4 0; Reqs. Bach. in Comp. Sci., Computer Information Systems, Computer, Electrical or Electronic Engineering. Systems Analysis or its equiv & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Systems Programmer, Programmer/Analyst, Systems Analyst, Software Engineer, Project Leader, System Specialist, Senior Systems Analyst or Consultant Will accept 3 yrs. college ed. plus 3 yrs. exp. in job offered or related occup. in lieu of req'd ed. & exp. Must have some related experience in software design & development on Sun workstations, & PC/AT using PC/AT. SunOS, UNIX(SCO). C++, C. $47,700/yr. 40 hr/wk , 8:30a-5p.

PROGRAMMER ANALYST (2 openings) (Ref. 17195) to consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to clients' needs; analyze, design, develop & implement computer software for clients' EDP systems; Making RTI (Response Time Improvement) changes to the system by adding new functionalities & making DLI calls to IMS databases more efficient Data flow design, technical support & overall design of Standard Filing Unit part of the system & meeting with users to gather requirements. Working on Production Problem Reports created by users & problem solving using help desk tickets on modules Comprehensive Scheduling & Standard Filing Unit & communicating with clients. Wording on Cycle Monitoring duty to keep track of the nightly batch cycle & fix the problems on-line to see the completion of the cycle. The technical support provided will be for design of applications using INS DB/DC on IBM 3090 using IBM 3090, MVS/ESA, INS DB/DC, COBOL II & TELON, Reqs. Bach. in Comp Sci., Computer Information Systems, Computer, Electrical or Electronic Engineering, Systems Analysis or its equiv. & 2 yrs. exp in job offered or 2 yrs. related exp. as a Programmer. Systems Programmer. Programmer/Analyst. Systems Analyst, Software Engineer. Consultant or Analyst Programmer. Will accept 3 yrs. college ed. plus 3 yrs exp. in job offered or related occup. in lieu of req'd ed. & exp. Must have some related exp. using each of the following: IBM 3090. IMS DB/DC. & COBOL II $41,000/yr. 40 hr/wk . 8:30a-5p.

PROGRAMMER ANALYST (2 openings) (Ref 18095) to consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to clients' needs. analyze. design. develop & implement computer software for clients' EDP systems Project management, database & system administration, design. development. implementation & maintenance of on-line & batch oriented commercial application software systems for banking. insurance, mutual funds. leasing. inventory control & other business applications, using database management systems, 4GLs, tools & utilities in a multi hardware/multi software environment, including UNISYS A Series. UNISYS B Series & IBM 3090 mainframes & IBM compatible PC-AT. using LINC II (vernion 14 & up). LITE. DMSII. COBOL, COMS. WFL. CANDE. LDAIII, ICC-Intercom, TSO/ISPF. JCL. CLIST, DCF. DOS. WINDOWS, MS-WORD: Req's Bach. in Comp Sci., Computer Information Systems. Computer. Electrical or Electronic Engineering. systems Analysis or its equiv. & 2 yrs. exp. in job offered or 2 yrs. related exp as a Programmer. Systems Programmer. Programmer/Analyst. Systems Analyst, Software Engineer. Project Manager. Contract Programmer or Consultant Will accept 3 yrs. college ed plus 3 yrs. exp. in job offered or related occup. in lieu of req'd ed & exp Must have some related exp in each of the following working on financial/commercial applications including banking. insurance & mutual funds, using UNISYS A Series. UNISYS B Series, IBM 3090. DMS II. COBOL, COMS, WFL CANDE, DCF & CLIST. LINC 14 $44,000/yr. 40 hr/wk., 8:30a-5p

PROGRAMMER ANALYST (2 openings) (Ref 18195) to consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to clients' needs, analyze, design. develop a implement computer software for clients' EDP systems: analyze. design & develop a networking product. overall design develop & implement a network communication protocol using TSAM interface on UNISYS 2200 computers, work on OS1100 on UNISYS 2200 using TSAM-TCP/IP UCS C. MASK. PADS. FLIT. SYSLIB. COMUS. SOLAR. SIMAN Knowledge of MAPPER. DMS1100 & LINC 1100: Reqs Bach in Comp. Sci . Computer Information Systems. Computer. Electrical or Electronic Engineering. Systems Analysis or its equiv & 2 yrs. exp. in job offered or 2 yrs related exp. as a Programmer, Systems Programmer. Programmer/Analyst. Systems Analyst, Software Engineer or Consultant. Will accept 3 yrs college ed. plus 3 yrs exp. in job offered or related occup. in lieu of req'd ed. & exp. Must have some related experience using each of the following UNISYS 2200, OS1100. UCSC. MASM, PADS. FLIT SYSLIB. COMUS, MAPPER & LINC1100 $46,000/yr 40 hr/wk . 8 30a-5p Send resume to 7310 Woodward Ave. Rm 415. Detroit. MI 48202 & include Ref # Employer Paid Ad

RECRUIT THE BEST!

Place your advertisement in regional or national editions of *Computerworld's Computer Careers* section. For more information call Lisa McGrath.

800-343-6474

(in MA, 508-879-0700)

Conference Call

Computerworld's
Corporate Technical Recruiting Conference

Suburban Denver, Colorado
June 11-14, 1995

For more information, call
1-800-488-9204

*Clip and FAX this coupon to **1-508-620-9430** or call **1-800-488-9204** for more information.*

Please place my name on your mailing list so I'll receive registration materials and information throughout the year.

Name______________________________

Title ______________________________

Company______________________________

Address ______________________________

City________________ State _____ Zip Code________

Phone ________________ Fax ________________

e-mail ______________________________

CTRC

Conference Call

Computerworld's Corporate Technical Recruiting Conference
Suburban Denver, Colorado
June 11-14, 1995

For more information, call
1-800-488-9204

*Clip and **FAX** this coupon to **1-508-875-3202** or call **1-800-488-9204** for more information.*

Please place my name on your mailing list, so I'll receive registration materials and information throughout the year.

Name ______________________ Title ______________________

Company ______________________

Address ______________________

City ______________________ State __________ Zip Code __________

Phone __________ Fax __________ e-mail __________

CTRC

RAID's momentum as the new storage medium of choice extends beyond the PC server to midrange servers and mainframe sites. To learn how RAID is changing the way storage systems are purchased, check out the **CW Guide to RAID Storage Devices**, page 77.

Low-end RAID gains *sophistication*

Although RAID is still less pervasive at the low end, its acceptance is growing and so are the options

By Alan R. Earls

The words "small," "cheap" and "RAID" have seldom been mentioned in the same breath, but the differences between RAID products for mainframe and server-level systems are becoming few and far between.

No longer separated by a vast technological gulf, the two markets now provide remarkably similar disk array products. More important, users no longer dismiss RAID for PCs and servers as frivolity.

"The only areas where vendors might skimp at the low end is in having less redundancy for fans and power supplies," says Phil Davin, vice president and chief analyst at Dataquest, Inc. in San Jose, Calif. Moreover, RAID's cost is dropping.

Designed to protect against system failure by storing data across multiple drives, RAID has grown in value as critical applications and information are increasingly placed on departmental servers.

"A year or two back, many people still thought [low-end] RAID was like snake oil," says Bill Frank, president of Augur Visions, Inc., a market research firm in Los Altos, Calif. "They weren't sure they needed it and weren't convinced it really worked." Since then, the tables have turned.

Market madness

In fact, the RAID market as a whole is exploding, with at least 150 key vendors, according to James Porter, president of Disk/Trend, Inc., a market research firm in Mountain View, Calif. "If you take out the companies selling primarily to the high end, you still have a good 100 to 120 companies selling for PC servers."

The lion's share of the server-level RAID business belongs to the likes of Compaq Computer Corp., with AT&T Global Information Solutions, Hewlett-Packard Co. and IBM playing significant roles. In addition, Tricord Systems, Inc. and NetFrame Systems, Inc. do a solid business packaging RAID with their servers, Porter says.

Other contributors include value-added resellers (VAR), systems integrators and an assortment of component and software vendors, Porter says. Mylex Corp., a manufacturer in Fremont, Calif., for example, is very popular. "They are critical to this market because they build the controller board that practically everyone uses within their RAID," Porter says. "Everyone" includes VARs and systems integrators.

High interest, low-tech implementation

Despite increased interest, RAID solutions favored for servers tend to be "low tech" at the moment. That is, many users opt for Novell, Inc. file servers that rely on NetWare's RAID functionality. "Novell has made redundancy and RAID safe choices that are easy to integrate," says Dan Friedlander, a storage consultant in Boulder, Colo.

In fact, Novell has made RAID so easy it is often all but invisible, Frank says. "Most Novell users we survey don't identify themselves as having RAID. But if you ask them about mirroring — which is by definition RAID Level 1 — they will say, 'of course.'"

When moving beyond NetWare RAID, however, the choices quickly become more complex, says Mike Casey, vice president of storage research at Computer Intelligence InfoCorp in Santa Clara, Calif. But "it really depends on what you're trying to accomplish."

To pick a system, it's important to have a clear idea about the disk access time required as well as what data really needs RAID protection. "Think about everything you do and try to set some priorities," Casey says.

Buyer beware

You will also want to comparison shop, but use caution when dealing with anyone other than systems vendors, Porter advises. Newcomers may offer pretty packages and neatly wrapped wires, but they lack the experience to answer tough questions.

Users may even contemplate designing their own RAID configurations with the number of available inexpensive disks, but analysts warn it takes a fair investment in time to become savvy enough about disk array technology "to be able to second-guess a vendor," Casey says.

If RAID is not within your reach yet, wait. As with other kinds of disk storage, RAID's cost is dropping nearly 20% per year, Davin says. Similarly, Friedlander estimates that most low-level RAID schemes — from Level 0 to 4 — cost only about 20% more per megabyte than nonredundant drives. ■

Earls is a freelance writer in Franklin, Mass.

INCREASED REDUNDANCY: Just about all the major players in the server DASD subsystem market have delivered RAID

(Worldwide figures)

Vendor	Revenue	Market share
Compaq	$269.5M	40.1%
Hewlett-Packard	$124.8M	18.6%
AT&T Global Information Solutions	$95M	14.1%
IBM	$38.9M	5.8%
Storage Dimensions	$31.5M	4.7%
Micropolis	$25.8M	3.8%
Digital	$23.8M	3.5%
Sanyo Icon International	$20.4M	3%
Storage Solutions	$13.5M	2%
Core International	$10M	1.5%
Other	$18.9M	2.9%
TOTAL	$672.1M	100%

Source: International Data Corp., Framingham, Mass.

Networking Management

WHEN A WARM BOOT DOESN'T WORK... THERE'S ALWAYS THE IPS-110

- Remote power cycle 1 to 1,024 devices from single line
- User ID/Password Security, with device database
- User programmable power sequencing
- Dial-Back, individual power loss, temp, UPS on battery
- VT100 Emulation,2400 Baud built in modem
- Internal battery backup
- Current verification on each device
- 30 Day Money Back Guarantee, One Year Warranty

FOR A PERSONALLY GUIDED DEMO CALL:
1-800-776-4346

LodeStar Technologies Inc.

Networking Management Tools

FILEAUDITOR® TELLS ALL!

WHO GOT INTO WHAT FILES, WHEN?

FileAuditor enhances your network security by...

▲ Tracking file and directory activity on the network.
▲ Having proactive network security with NLMAuto or NLMerlin
▲ Denying access to specific files.
▲ Generating custom reports.

If you need enhanced network security
Call: **1-800-333-8698**
FAX: (602) 545-0008
Knozall Systems, 375 E. Elliot Rd, #10 Chandler, AZ 85225
A Division of Tongram Enterprise Solutions

Knozall

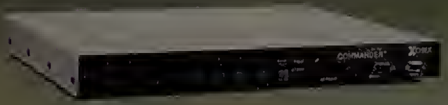
Our Family Tree is Branching Out!

AutoBoot Commander

The original AutoBoot; lets you monitor and operate multiple PCs or file servers with just one keyboard, monitor and mouse.

Personal Commander

All the features of the AutoBoot in a smaller, more personal size. Measuring under 8" across, the Personal Commander is perfect for the desktop.



Slimline Commander

The most streamlined member of the AutoBoot family. At only 1.75" high, the Slimline Commander can be fitted easily into your computer rack using a minimum of space.

AutoBoot Commander 4xP

Adds multiuser, multimedia & multiplatform capabilities to the Commander line; up to 4 users can access multiple PC, Mac & Sun computers from one central location!

Cybex Corporation
4912 Research Drive Huntsville AL 35805 USA
(205) 430-4000 (205) 430-4030 fax

See Us At Networks Expo, Booth # 115 and at CeBit Booth #'s M9 and M10.

PC is a registered trademark of International Business Machines Corporation. Mac is a registered trademark of Apple Computer, Inc. Sun is a trademark of Sun Microsystems. Cybex, AutoBoot, Slimline, and Commander are trademarks of Cybex Corporation.

CYBEX™

New Products – Hardware

Computer Presentations

NEW!

Three for the show.

An Inc. 500® Company

BEST SELLER

Affordable color! Our most popular product just got even better. Better wall-sized true-color projection at the same unbeatable price. The BOXLIGHT ColorShow 1200 is our best seller for a good reason - value!

BOXLIGHT 1200. $2,299

- ♦ 24,389 vibrant colors
- ♦ Universal PC and Mac compatibility
- ♦ Compact, portable design
- ♦ FREE remote control and cables
- ♦ Brightest color at any price
- ♦ Now with faster mouse response!

COLORSHOW 2000. $3,999

The ONLY "all-in-one" LCD data projector priced under $4,000 is now available exclusively from BOXLIGHT! The sleek, compact design offers unobtrusive operation in the boardroom and folds for ultimate portability. The bright STN technology delivers rich brilliant color from your PC or Mac. If the convenience and performance of an integrated projector is right for you, the ColorShow 2000 is unbeatable.

INTRO PRICE

- ♦ Sleek, compact and stylish design
- ♦ Compatible with PC or Mac
- ♦ Less than 20 lbs. travel weight
- ♦ Includes free remote control
- ♦ Optional Computer Control Wand

SPECIAL OFFER

Active-matrix Color at a passive matrix price! TFT 24-bit processing for photo-realistic color in an under $3,000 panel! Fast-changing meetings require the speed of active-matrix technology. BOXLIGHT's best-selling ProColor is the choice of hundreds of our Fortune 1000, Government and Higher Education customers, like YOU!

PROCOLOR 1300. $2,999

- ♦ 16.8 million color palette
- ♦ Lightweight, reliable and rugged design
- ♦ PC/Mac compatible upgradeable to video
- ♦ Multimedia model 1500 only $3,799!

BOXLIGHT: Your direct source for all the bright answers.

- ♦ More than 50 models in stock
- ♦ Instant availability
- ♦ Overnight shipping
- ♦ 30-day guarantee and extended warranties
- ♦ Expert technical support

ANNIVERSARY 10th

No one else offers the one-stop shopping...the selection... the value...the immediate delivery... and the knowledgeable service and support you get from the projection panel experts.

The Inc. 500 logo is a registered trademark of Goldhirsh Group, Inc.

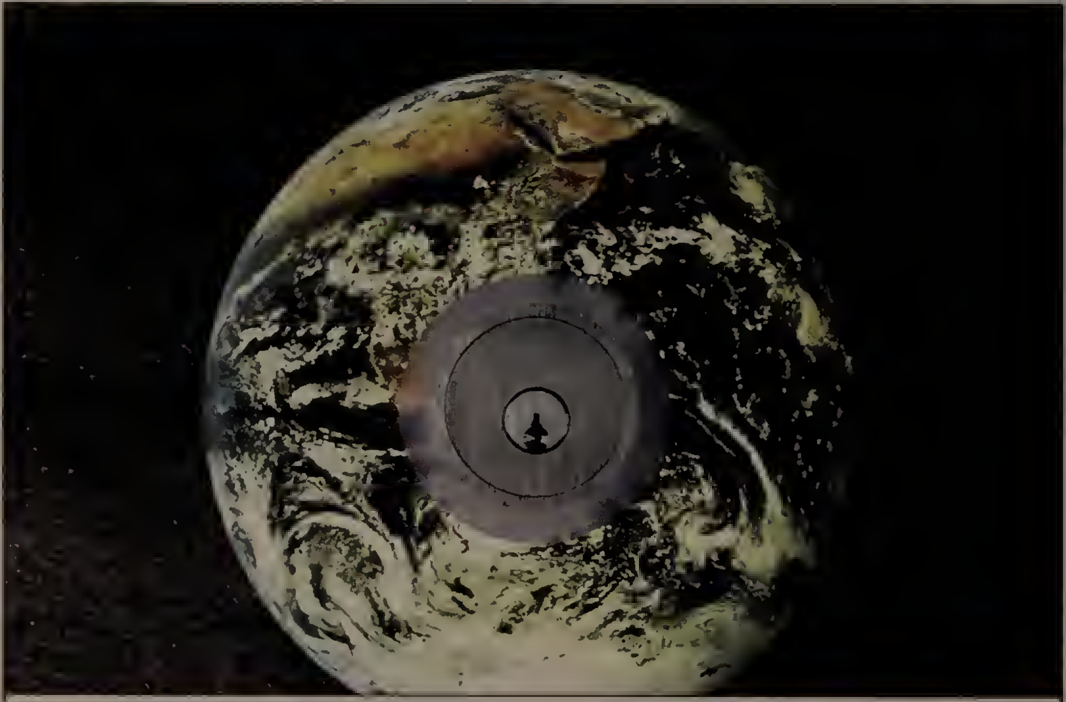
BOXLIGHT™ CORPORATION

17771 Fjord Dr. N.E., Poulsbo, WA 98370 • 206/779-7901
Payment: VISA, MasterCard, American Express, COD and Purchase Orders (some restrictions). Leasing and rental options available. 30-Day Money-Back Guarantee.

☎ Call today 1-800-762-5757

Government Sales 1-800497-4009
Reseller Sales 1-800-736-6956

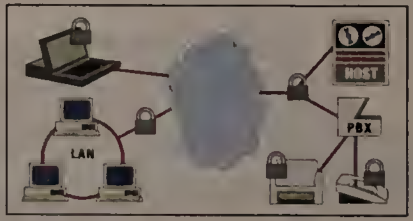
Network Security & Wireless Bridges



Cylink has the world locked up.

You *can* secure your information globally. You just need the right security partner. Only Cylink has spent the last ten years building a support organization in over 80 countries—working successfully with local governments, customs, and communications infrastructures. We can secure everything from applications on a laptop to global wide-area networks, from telephones to high-speed data links. We secure information for most of the world's money center banks, Fortune 500 companies, and government, police, and military organizations. Because of our experience, it's easier than you think to keep your information safe. Cylink Corporation, 910 Hermosa Court, Sunnyvale, California, USA, 94086. Telephone: 408-735-5800, FAX: 408-720-8294, Toll-free (USA): 800-533-3958. Worldwide sales & support.

FAX INFO: 800-833-9137 ext. 63.



England: Cylink, Ltd., Hampshire— TEL: +44-256-841919 • FAX +44-256-24156
Singapore: Cylink Corporation—TEL +65-336-6577 • FAX +65-334-1429
[illegible] Cylink Corporation. Cylink is a registered trademark of Cylink Corporation

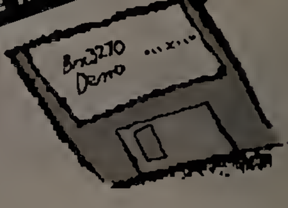
CYLINK

Mainframe Connectivity

How to connect

FREE!

NEW Brx3270 DEMO DISK



3270 SNA Emulation Software for Windows™

Access IBM mainframe applications from your PC.

- 3270 and Telnet 3270 clients for Windows 3.1
- File transfer and print
- Point & click programming
- 100% Winsock-compliant
- Graphical keyboard mapper
- Allows interactive query of applications like TSO, CICS, IMS, and NetView

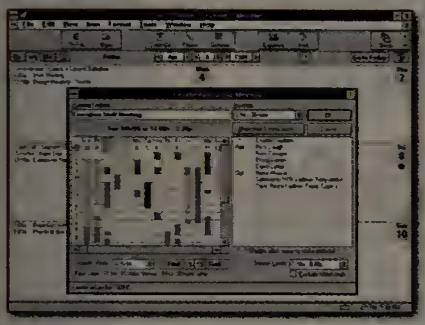
CALL 1-800 BRIXTON

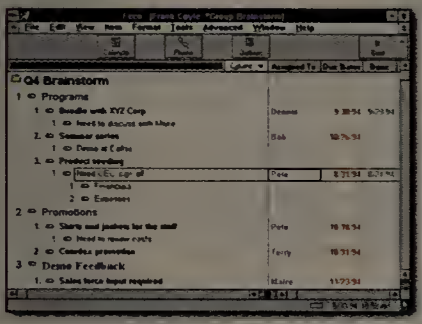
CNT/Brixton Systems, Inc.

Personal / Group Information Management

"Superb Workgroup Features....Group Scheduling is a Breeze"

- PC Computing, June & November 1994





Experience ECCO

Outstanding calendar, phonebook and group task management.

Simplify meeting making

Eliminate the hassles of meeting making with ECCO's Group Scheduling. Compatible with: *TCP/IP (NetManage Chameleon Mail), Microsoft Mail, cc:Mail, Lotus Notes, MHS. And interoperable with Microsoft Schedule+.*

Maximize workgroup productivity

Share projects, brainstorms, calendars, phone books. Make information public or private. Multi-level access privileges. Flexible enough for every user.

Keep everyone up-to-date

Ensure all members of your team are up-to-date – on the road, in remote sites, or in the office – with automatic, 2-way, file synchronization.

Here's what the experts are saying about ECCO:

"The Power PIM for the workgroup" - **PC Magazine**

"World Class" - **PC World**

"I'm utterly stunned" - **Steve Gibson, Noted InfoWorld Columnist**

NETMANAGE™

408/973-7171

e-mail: sales@netmanage.com

World-Wide Web: www.netmanage.com

©1995 NetManage. ECCO is a trademark of NetManage. Other trademarks are property of respective trademark holders.

Computer Presentation

Power Tools for the Power Presenter

One stop shop for all major brands
Convention Travel Forecast
SALES • LEASES • RENTALS
COLOR from $1,795

For the latest in color projection panels and projectors call the experts in LCD technology. Your satisfaction guaranteed or your money back. Quick delivery via Fed-X or UPS.

Call for CATALOG 1 800 726 3599

Panelight DISPLAY SYSTEMS, INC.

101 The Embarcadero Ste. 100-A, San Francisco, CA 94105
Hours: 6:30 to 5:30 PST, 9:30 to 8:30 EST
VOICE: 415 772 5800 FAX: 415 986 3817

Security

Kāblit™ Security

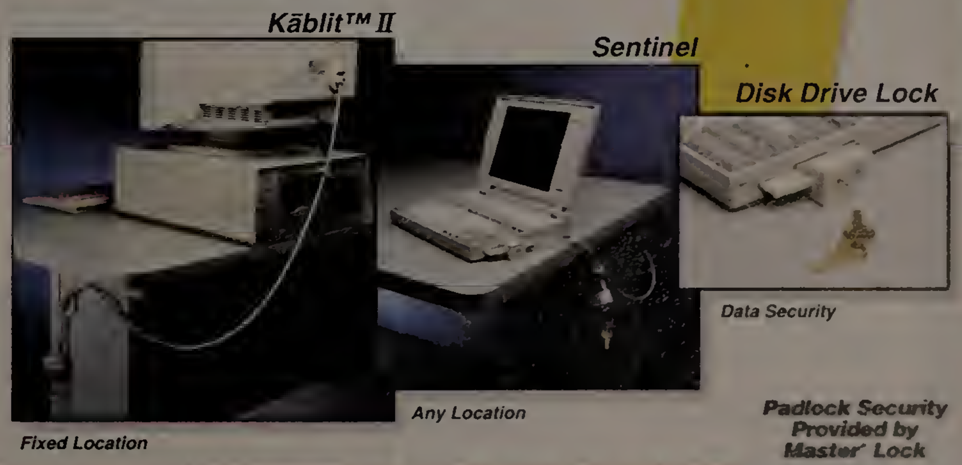
NOW!

STOP COMPUTER THEFT

IN THE OFFICE — ON THE ROAD

- **Secure computer or notebook to desk, table, etc.**
- **Lock disk drive — Protect data**
- **Lifetime warranty**

$24.95 to $49.95
Retail Price



Padlock Security Provided by Master Lock

Quick and Easy to Install!
Compact — Lightweight!
Available For Macintosh Computers Too!

Order Now — Call 800-451-7592

Secure-It

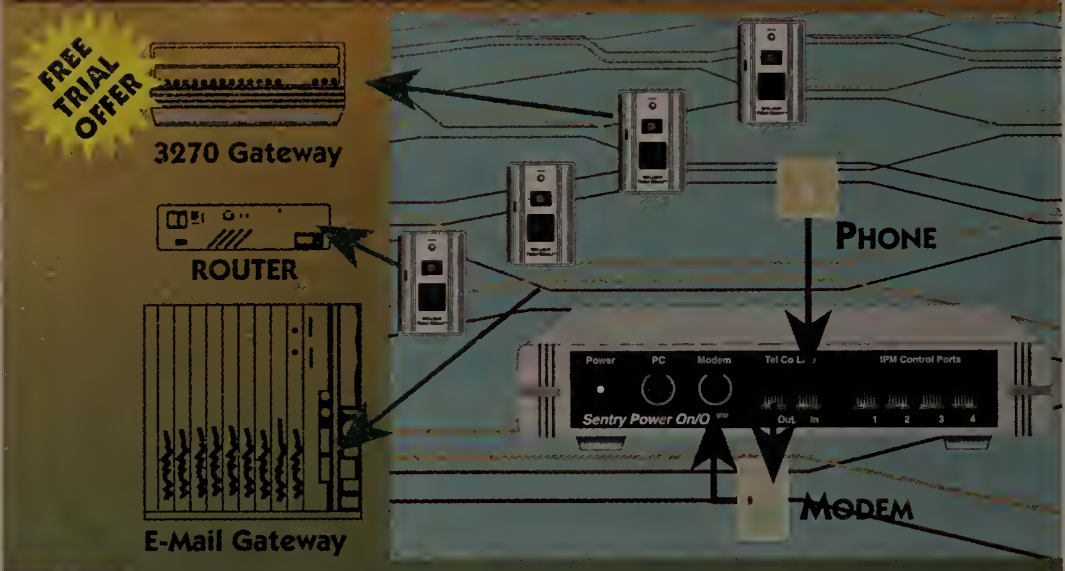
18 Maple Court, East Longmeadow, MA 01028

The particular Master Lock Trademarks used are trademarks of the Master Lock Company and are used by Secure-It, Inc. under license

Software – Buy / Sell / Lease

Networking Management

LOCKED-UP ROUTERS & OTHER WAN DEVICES USING THE SENTRY REMOTE POWER MANAGER



Re-Boot

Using an ANSI emulator, a network administrator, calls the sentry, enters a password and receives an on screen menu. From the menu individual ports can be toggled "power-off or power-on" to re-boot locked-up mission critical network devices. The Sentry supports 4 companion power modules which control the AC power flow to each network device.

When your remote Router, Modem, Gateway or, Access Server gets locked-up RE-BOOT IT using the Sentry Remote Power Manager.

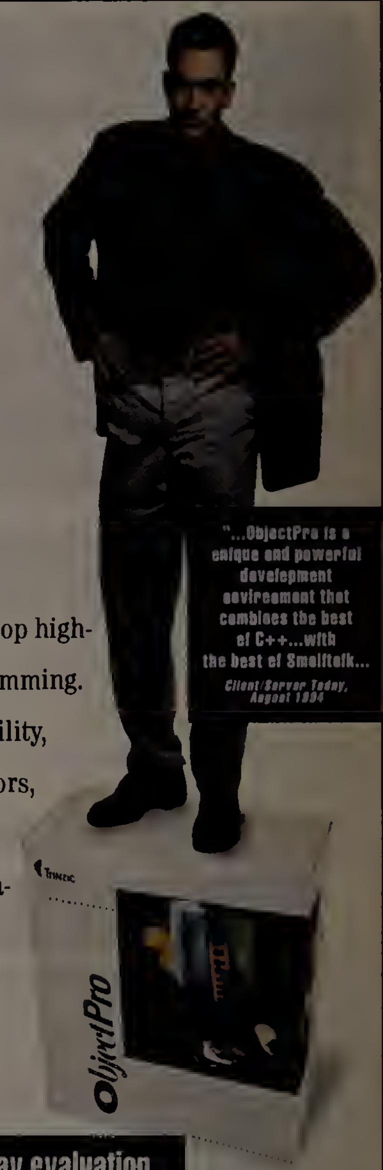
Sentry provides password secure power on/off REBOOT control to geographically distant network devices.

Call for info or a
Free Demo Disk
800/835-1515 U.S.

SERVER TECHNOLOGY
1288 Hammerwood Ave.
Sunnyvale, CA 94089
408/745-0300
Fax 408-745-0392

Object-Oriented Development

This ain't no bit-tweaking, candy-assed OO tool.


"...ObjectPro is a unique and powerful development environment that combines the best of C++...with the best of Smalltalk...
Client/Server Today, August 1994
Trinzic
ObjectPro

Introducing ObjectPro. The only OO tool that lets you develop high-performance, visual applications without low-level programming.

Supreme productivity. ObjectPro gives you the same flexibility, tools and power of C++ and Smalltalk *plus* powerful editors, browsers and debuggers. Just point, click and move on.

Ultimate object reuse. ObjectPro lets you assemble applications from custom class libraries, industry-standard controls, third-party solutions, or your own components to spin applications in record-breaking time.

Trinzic™

Call 1-800-234-7724 today for a FREE ObjectPro 30-day evaluation.

Trinzic Corporation, 101 University Avenue, Palo Alto, CA 94301. Voice: 415-328-9595, Fax: 415-321-7728, E-mail: objpro@trinzic.com
ObjectPro is a trademark of Trinzic Corporation. All other trademarks are the property of their respective companies.

CW 1/30

Buy / Sell / Lease

BUY • SELL • LEASE • RENT

IBM Systems • Peripherals • Parts & Service

SPECIALIZING IN:

- RISC System/6000®
- Workstations
- Parts & Features
- AS/400®
- Novell Networking
- Sun & Dec
- Personal Computers
- Data Communications
- UPS Systems
- Peripherals & Upgrades
- System 36 Conversions
- AutoCad

NEW & USED IN STOCK

Complete Technical Center, Installation, Stock Parts & Features for RISC.

Authorized Distributors for: **Seagate • Xerox Kingston • Cal Comp Motorola • UDS/Codex Decision Data Products**

8 Nationwide Locations

A Publicly Traded Company NASDAQ: MKPL

Computer Marketplace prides itself on being your one-call computer hardware solution.

COMPUTER MARKETPLACE

800-858-1144

TEL (909) 735-2102 • FAX (909) 735-5717
1490 Railroad Street • Corona, CA 91720

® IBM Trademark

CDLA CBE

Buy / Sell / Lease

Dempsey: Where IBM® Quality is Second Nature!

- AS/400
- INDUSTRIAL PC
- RS/6000
- SYSTEM/36
- SERIES/1
- 9370
- ES/9000
- PS/2 & VP

Sales & Rentals
- Processors
- Peripherals
- Upgrades

For pretested equipment, flexible financing, configuration planning, technical support and overnight shipping call.

Dempsey BUSINESS SYSTEMS

18377 Beach Blvd., Suite 323 • Huntington Beach, CA 92648
(714) 847-8486 • FAX (714) 847-3149

IBM Authorized Distributor Products Integrator

IBM is a registered trademark of International Business Machines Corporation.

(800) 888-2000

Computer Products

NC³

NATIONAL
COMMODITY
CLEARANCE
CENTER, INC.

TEL: 315.438.4400
FAX: 315.438.4213

IBM PS/2 PACKAGES

CPU #1 - **IBM 8580-111** 386SX 20MHz 2MB RAM/ 115 MBHD/ 3.5" Floppy	**$699**
CPU #2 - **IBM 8570-E61** 386SX 16 MHz 1MB RAM/ 60MBHD/ 3.5" Floppy	**$599**
CPU #3 - **IBM 8570-061** 386SX-20 MHz 1MB RAM/ 60 MBHD/ 3.5" Floppy	**$649**

Each Package includes:

IBM 8515-001 Monitor 14".28 SVGA 1024x768 XGA Display
AND
NEW Olivetti DM600s Printer 24 PIN Wide Carriage
up to 300 CPS/ Epson & IBM emulation

Equipment carries a 90 day back-to-depot warranty. Call for complete inventory list. Equipment is subject to prior sale, pricing may change without notice. This ad could contain technical inaccuracies or typographical errors. FOB Syracuse. Visa, COD Cash, or Prepaid. Authorized returns of products for refund are subject to a 20% restocking charge and are limited to 15 days from invoice date.

Outsourcing / Remote Computing

ALICOMP, INC.

The "Boutique" of the Computer Services World

Outsourcing Remote Computing
VM, MVS, VSE

Two State of the Art Locations:

ALICOMP / CBS
20,000 sq. ft. Manhattan complex 105,000 sq. ft. Secaucus, NJ complex

"Our Platform is Excellence"

Serving Clients Since 1980
(212) 886-3600 • (800) 274-5556

Large Systems Computers & Peripherals

IBM

- ES/9000
- SERIES/1
- AS/400
- RS/6000
- SYSTEM/88
- Point Of Sale

...and more!

New & Used

- *Computers*
- *Peripherals*
- *Upgrades*

Buy • Sell • Rent • Lease

amdahl
Cisco
Concurrent
Data General
digital
HDS Hitachi
HEWLETT PACKARD
Memorex-Telex
Prime
Silicon Graphics
Stratus
Sun
TANDEM
TEXAS INSTRUMENTS
UNISYS
XEROX

SPECTRA
(800) 745-1233
(714) 970-7000 • (714) 970-7095 Fax

Anaheim Corporate Center
5101 E. La Palma Ave., Second Floor
Anaheim, CA 92807

Bids / Proposals

MS CENTRAL
DATA PROCESSING AUTHORITY

Sealed proposals will be received by CDPA, 301 N. Lamar St., 301 Bldg, Suite 508, Jackson, MS 39201 for the following:

RFP 2685 due Tuesday, March 7, 1995 @ 3:30 P.M. for bid submissions offered for inclusion on the EXPRESS PRDDUCTS LIST (EPL) to be used in the acquisition of specific categories of microcomputer-based systems, peripherals and software for the State of Mississippi through July 31, 1995. No Charge
For Internet retrieval:
anonymous FTP to www.cdpa.state.ms.us /pub/vendors/epl_inst.txt

RFP 2687 due Tuesday, February 28, 1995 @ 3:30 P.M. for the acquisition of 56 90MHZ Pentium-based microcomputers, 112 20" color monitors and related hard ware and software on which to continue the implementation of their Intergraph Computer Assisted Drafting and Design application statewide for the Mississippi Department of Transportation. No Charge.

Vendors may request RFPs with no charge by calling Linda Watkins at (601) 359-2604 CDPA reserves the right to reject any/all bids and to waive informalities.

Bids / Proposals

CITY OF OAKLAND, CA
MEASURE I EMERGENCY RESPONSE SYSTEM (MIERS)
EMERGENCY MANAGEMENT INFORMATION SYSTEM
PUBLIC NOTICE

The Measure I Emergency Response Systems (MIERS) is a project which willl result in the design, development and implementation of a system which provides the functionality to prepare for, respond to and recover from five major classes of emergencies: 1) Hazardous Materials, 2) Fire, 3) Flood, 4) Civil Disturbance and 5) Earthquake.

The system will be designed, developed and implemented using a release methodology spanning a five (5) to seven (7) year period. In the first phase, the design, development and implementation requirements for hazardous materials emergency preparedness, response and recovery shall be developed. By February 10, 1995, companies that wish to be on the mailing list of Phase I (Hazardous Materials) of the project should contact the address below. We are also seeking minority, women's, and small local business participation (M/W/SLBE).

MIERS c/o CH2M HILL
P.O. Box 12681
Oakland, CA 94604-2681
(510) 251-2888, x3502
email:miers@ch2m.com or browse www.ch2m.com

Bids / Proposals

METROPOLITAN TRANSPORTATION AUTHORITY NOTICE is hereby given that the Authority will receive sealed bids for the following Services as indicated below, on which date they will be opened at the indicated time at the Authority's offices at 347 Madison Avenue, New York, NY 10017 (5th floor). Bids must be submitted on the Inquiry form provided by the Authority. Copies of such forms may be secured from Ms. Jean Benning, Systems Administrator, Procurement Services, Metropolitan Transportation Authority, 347 Madison Avenue, New York, N.Y. 10017-3706 or by calling (212) 878-7209.

INQUIRY 5-01-95010-0
DATE 2/28/95
TIME 4:00 P.M.

Application Developer's Toolbox

PRINT STREAM MANAGEMENT

Enhance the Productivity of Your Legacy Applications

Introducing StreamWeaver™... the latest in print stream management technology.

With StreamWeaver, you can change your output without changing your applications. The benefits are clear:

- **Combine output from multiple business applications without costly programming changes**
- **Increase the productivity of your legacy applications**
- **Extend the life of your mainframe**
- **Works with all IBM and IBM-compatible mainframe applications**

Reduce costs. Increase efficiency. Call
(800) 624-5377

LPC
A Pitney Bowes Company

StreamWeaver is a product of PDR Automated Systems and Publications, Inc

Outsourcing / Remote Computing

Your best choice for mainframe computing services.

OUTSOURCING
REMOTE
COMPUTING

Extensive Software Library

Telenet	Tymnet
Advantis	Compuserve

MVS/ESA	IMS/DBDC
VM/ESA	CICS SAS
VSE/ESA	TSO DB2

Extraordinary Customer Service
Migration Management

708-574-3636
New England 617-595-8000
815 Commerce Drive, Oak Brook, IL 60521

FANEUIL
SYSTEMS

Outsourcing

If Outsourcing is your objective...

You can maximize your information technology investment by outsourcing part – or all – of your IS operation. Whether it's a transitional or long-term total services partnership, American Software's the right place to rightsize.

Even software developers enjoy the cost and time-saving benefits of outsourcing with us. Call today and we'll tell you why.

®*The Outsourcing Group*
A Unit of American Software USA
470 E. Paces Ferry Road
Atlanta, GA 30305
404-264-5770

Solutions Directory

401(k) ADMINISTRATION

DELTA DATA SERVICES, INC..................
(800) 451-9188
Defined contribution administration software for the plan sponsor. Interfaces with payroll to administer 401K, ESOP, thrift, and profit sharing plans. Daily or periodic processing, distributions, loans, ADP/ACP testing. User defined statements, voice response. Runs on AS/400 and PC.

ACCOUNTING

M • A • S 90 EVOLUTION/2 Accounting Software at Discount Prices?
Pay ***DISCOUNTED*** prices for the premier accounting solution. Industrial strength G/L, A/P, A/R, Payroll (with multiple city/state taxation), J/C, P/O, Sales Order, Point of Sale, Inv Mgmt, Time & Billing, many others. Dos/Windows/UNIX platforms supported.
CORLOR Development, Inc. (505) 281-7151

APPLICATIONS CONVERSION

AUTOMATED CONVERSION SPECIALISTS
DOS to MVS HONEYWELL to IBM
MACRO to COMMAND CSP to COBOL/CICS
RPG to COBOL COBOL to COBOL II
PL/1 to COBOL CENTURY EXPANSION
Other Platform/Language Conversions
BELCASTRO COMPUTER SERVICES, INC.
800-521-2861 216-652-1628

MIGRATION - CONSOLIDATION
SERVICES:
VSE to MVS Migrations/MVS Re-Design
Data Center Consolidations
DFSMS Migrations
Project Management
COBOL/VS to COBOL/II/370 Conversions
Systems Integration & Re-Design, Inc.
(504) 834-2293

APPLICATIONS DEVELOPMENT

APPLICATION DEVELOPER'S TOOLBOX
See proceeding page in Marketplace.

Tired of maintaining your legacy applications?
LPC........................ (800) 624-5377

C++

C++ and Object Technology Training
5-day, on-site seminars on C++, Visual C++. Borland C++, OOA/OOD, Visual Basic, and C. We customize our courses to your needs. Contact us today for course outlines and pricing.
DEITEL & ASSOCIATES
deitel@world.std.com
Phone: (508) 877-0273 FAX: (508) 788-0937

C++ Training, Design, Emergency Code Repairs.
Rowe Technology ....(408) 375-9449

CLIENT SERVER DEVELOPERS

Re-Engineer NOW!!!
Let our highly motivated professionals help your corporation make the successful transition from your existing mission critical applications into object-oriented client/server systems. Powerbuilder, C/C++, Visual Basic. Sybase/Oracle/Informix. Imaging, Wireless. ISP.
Innovative Information Technologies, Inc.
1-800-352-2797

Millennium Computer Corp. "Quality Solutions"
On Schedule, Within Budget .....(716) 248-0510

COMPUTER/TEL INTEGRATION

Computer/Telephone Integration
Consulting & Design.
Expert guidance for the medium to large call center environment. ANI/DNIS routing - Call/Data-screen synchronization - Caller Profile call routing. Functional Specifications-Design-Documentation.
Get it right the 1st time!
INSIGHT SERVICES 1-800-877-9024

CONTRACT PROGRAMMING

PC programming, DOS/WINDOWS $30/hr. Courseware Appl............ (612) 854-8909 Fax (612) 854-1868

NASTEL Technologies
Prime source for cost effective, high quality, onsite/offsite software development. Expertise in Oracle, Informix, Sybase, Powerbuilder, Client Server applications, re-engineering (multimedia, windows) and CAD conversions. Reliable delivery. Excellent References.
(212) 251-0787 Fax 212-689-4950

SAVE 50%-70%
ON PROGRAMMING
While using some of the most sophisticated programmers in the world. All customer contact handled in the U.S.

- **Client Server**
- **New Application Development**
- **Updating & Porting to New Platforms**

Typhoon Software, Inc.
800-499-0888

DATA RECOVERY

RANDOMEX Data Recovery Service
Hard Drives - Tapes - Floppies - Disk Packs
Crashes/Power Failures/Viruses/Fire
Average Turnaround 72 Hours
98% Success Rate On Recoverable Data
14 Years Experience * 23 Operating Systems
800-726-3669 (Long Beach, CA)
800-466-0893 (Boston, MA)

DATA WAREHOUSING

The Data Warehouse Experts
Looking for a company with years of experience in true Data Warehouse implementation? Look no further! Let Solveris help unlock the power of your information system!
Solveris Inc.
(800)-999-4829

EDUCATION & TRAINING

Information Security Training & Publications
CSI Membership includes: monthly newsletter, buyers guide, journal, training discounts, hotline, networking, more. Seminars, conferences. June Network Security Conference in New Orleans. For free sample newsletter and information:

Fax (415) 905-2218. CSI, 600 Harrison St. SF, CA 94107, phone (415) 905-2626, e-mail: prapalus@mfi.com.

Visual Basic, C++, OOA-OOD,ORACLE
Texas Software................ (800) 252-7007

EASY TECHNICAL UPDATING
50-Minute videos, $29.95 each, on today's crucial topics (client/server, OOPS, software engineering, networking, AI) by over 40 leaders (Stroustrup, Bell, Knuth, Microsoft, etc.) CONTACT UVC, toll-free 1-800-900-1510 x1112; uvc.lemon@forsythe.stanford.edu. FREE CATALOG. SATISFACTION GUARANTEED.

FAX-COMPUTER INTEGRATION

ABConsultants 1-800-982-3715
Planning a fax-on-demand, fax broadcasting or fax server system? Get professional help in:

- Analyzing needs & planning the system
- Selecting the best system for superior customer service & maximum savings.
- Implementation, training and startup

Get Information by fax at 408-243-2275

GROUPWARE LOTUS NOTES

Nationwide Professional Services
Summit Software Services, Inc. . . . . (503) 226-6250

I/T CONSULTING

MAINFRAME SOFTWARE SUPPORT SERVICES OPERATING SYSTEM MIGRATION, PERFORMANCE TUNING, DATABASE, PROGRAM PRODUCT SUPPORT DATA MANAGEMENT, CICS, DB2, IMS, NCP, VTAM AND MANAGEMENT CONSULTING

CAMERON OF ATLANTA, INC. (800) 331-7635

OFFSHORE SOFTWARE DEV.

COSTA RICA - "A BETTER WAY"
Low-cost, hi-quality offshore programming, Central Time Zone, 3 hour flight from USA. Satellite Links. Oracle, Visual Basic, Powerbuilder, Sybase, C++, COBOL, AS400.
Hestair, Houston .... (800) 448-7277

Hexaware Technologies -
A Blue Chip Resume:

- ***Client/Server*** technology focus
  - **Oracle, Sybase**
  - **Powerbuilder, Uniface, Visual Basic**
- Complete Turnkey responsibility
- Virtual 64 kbps data link from your office to India
- State-of-the-art software development center in India.....
- Large pool of quality software talent
- International quality standards
- Success stories in US/Middle East/India
- Joint Venture option

Tel: (609) 951-9195; Fax (609) 951-9638;
Partner for Success
Hexaware Technologies, Inc.
Princeton • Bombay • Bahrain • Dammam

Serving the Northwest USA
⋆ Providers of quality software development. Options for Joint Venture. Services:
New Development Re-engineering
Migration Client-Server/PC/RDBMS
Testing/QA Product Enhancement
LINCROSS SOFTWARE SYSTEMS, INC.
(206) 236-5847
INDIA • SINGAPORE

OUTSOURCING

Outsourcing/Remote Computing
IBM, MVS/ESA
Transistional Outsourcing
Specializing in high online transaction environments, Multiple mainframes, Reasonable prices
Consultec, Inc.
Contact: Carey Gibson
(800) 358-2381 ext. 330

ISO 9001 CERTIFIED OFF-SHORE/
ON-SITE SOFTWARE SERVICES
Substantial cost savings on Development, Maintenance, Conversion, Rightsizing using Indian facility with in-house IBM 9000, AS/400, RS 6000, SUN and CICS, DB2, IMS, COBOL, RPG, SYNON, Oracle, Sybase, Visual Basic, Powerbuilder, Uniface, C++.
D Square Software, Inc.
Tel: (908) 632-2688 Fax: (908) 632-2692

FANEUIL SYSTEMS provides mainframe based Outsourcing and Remote Computing Services for well over a decade. Our reputation for providing high quality services in a flexible and cost effective manner is undisputed in the industry. **Join** the many others who have already made the **right choice, call FANEUIL SYSTEMS at (708) 574-3636. (See Our Ad in the Marketplace Section)**

FINANCIAL TECHNOLOGIES
COMPUTER SERVICES DIVISION
(703) 631-4401
OUTSOURCING - REMOTE PROCESSING
Multiple IBM ES9000 Mainframes
MVS/ESA VM/ESA
Current Software Releases.
7 days/week, 24 hours/day
Quality Service - Competitive Pricing

OUTSOURCING/REMOTE COMPUTING
For 26 years we have nationally located outsourcing services on all platforms from over 2,000 data centers. **NEVER** a fee to our buyers because we are paid by our sellers. Call us today and join over 1,500 satisfied customers!
COMPUTER RESERVES, INC.
(800) 882-0988

MCRB Service Bureau, Inc.
3090 Computer Services ....(800) 941-MCRB

PURCHASING SOFTWARE

Commerce Software, Inc. (PurchaseSQL™)
Elmsford, NY .... (800) 447-7172

REMOTE COMPUTING

FANEUIL SYSTEMS provides mainframe based Outsourcing and Remote Computing Services for well over a decade. Our reputation for providing high quality services in a flexible and cost effective manner is undisputed in the industry. **Join** the many others who have already made the **right choice, call FANEUIL SYSTEMS at (708) 574-3636. (See Our Ad in the Marketplace Section)**

RIGHTSIZING

MCRB Service Bureau, Inc.
3090 Computer Services ...... (800) 941-MCRB

SOFTWARE REENGINEERING

Reuse Your Existing Software Assets

- Computer language translation and migration reengineering services converting into C, C++, Ada, and COBOL
- Services guaranteed for: functionality; maintainability; price; delivery date.
- Language and platform independent

Alydaar Software Corporation:
(504) 845-3322

SOFTWARE REUSE

RPM ™
Reuse Process Manager ™
"a windows and C/S based process manager with a customizable environment for defining, measuring and practicing reuse-driven software development"
developed by Dr. Carma McClure
Extended Intelligence, Inc.
(312) 346-5245 x360

Have Solutions To Sell ? You Can Sell Them HERE!

In the Computerworld Marketplace Solutions Directory.
You simply choose the type of listing you want, and we'll run it for 26 consecutive weeks - under the category of your choice!
Plus, you can run your listing under an additional category at 50% discount rate.

Please Fax Your Listing/Category to: Nancy Whittaker 1-508-820-0941 **Or Call: 1-800-343-6474 x744**

Computerworld, Inc.

CEO/President
Gary J. Beach

Executive Vice President:
Steven F. Woit

Senior Vice President/Finance:
Matthew C. Smith

Vice President/Human Resources:
Susan C. Perry

Executive Assistant to the CEO/President
Karen E. Elliott

Computerworld

An IDG Company: The World's Leader in Information Services on Information Technology
Publisher
Kevin McPherson
Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-875-4394

Vice-President Editorial
Bill Laberis

Vice-President Sales/Associate Publisher
David Peterson

Vice-President Consumer Marketing
Gail Odeneal

PUBLISHER'S OFFICE: *Assistant to the Publisher,* Lois Beninati **SALES CLASSIFIED:** *Classified Operations Director,* Cynthia Delany **MARKETING:** *Director, Marketing Communications,* Mary Doyle, *Account Manager, Marketing Communications,* Elizabeth Phillips, *Manager, Trade Show & Conventions,* Audrey Shohan, *Marketing Communications Project Manager,* Susan Thaxter, *Administrative Assistant,* Patty White **CIRCULATION:** *Director of Circulation Management,* Maureen Burke **PRODUCTION:** *Production Director,* Christopher P. Cuoco, *Production Manager,* Beverly Wolff **DISTRIBUTION:** *Distribution Manager,* Bob Wescott, *Traffic Manager,* Pat Walker

Sales Offices

Associate Publisher/Vice-President/Sales
David Peterson
Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171 Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-879-0446

Northeast

Regional Vice President: Sherry Driscoll, Senior District Managers: Bill Cadigan, John Watts, Sales Assistants: Alice Longley, Tammy Gryniewicz, Laura Holliday, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 872-2915 TDD: (800) 428-8244

Mid-Atlantic

Senior District Managers: Fred LoSapio, Vicki Gonin, Rich Molden, Sales Assistants: Susan Kusnic, Jean Dellarobba, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786 TDD: (800) 208-0288

South-Atlantic

Regional Vice President: Bernie Hockswender, Sales Assistant: Jennifer Pattenaude, 3675 Crestwood Parkway, Suite 400, Duluth, GA 30136 (404) 931-8104 FAX: (404) 931-8106 TDD: (800) 449-4974

Midwest

Senior District Manager: Sharon R. O'Brien, Sales Assistant: Denice Richards, 980 N. Michigan Avenue, Suite 1400, Chicago, IL 60611 (312) 214-3606 FAX: (312) 214-4962

Southwest

Senior District Manager: Darren Ford, Sales Assistant: Brenda Shipman, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882 FAX: (214) 385-1603 TDD: (800) 822-4918

Northern California

Vice-President Western Advertising Sales: Richard Espinoza, Senior District Managers: Ernie Chamberlain, Kaye Sharbrongh, Linda Holbrook, District Managers: Christine Curry, Elizabeth Cooper, Lisa Kowalski, West Coast Operations Manager: Leticia Lehane, Sales Associates: Denise Hui, Emily Gaytan, Shannon Dempsey, Denise Garcia, Andrea Zurek, Jim Schott, Colleen Molnar 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312 TDD: (800) 900-3179

Southern California

District Manager: Nancy Coy, Sales Associate: Rachel Swartz, 2171 Campus Drive, Suite 300, Irvine, CA 92715 (714) 250-3942 FAX: (714) 476-8724

Advertising Operations

Display Advertising Production Manager: Paula Wright, Display Advertising Coordinators: Lisa Tanner, Peggy Hennessy, Gregg Pinsky, (508)-879-0700 FAX: (508) 879-0446

Custom Publications

Boston: Vice President/Larry Craven, Director of Publishing Services/Carolyn Novack, Sales Assistant/Heidi Broadley, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 879-0446

San Francisco: West Coast Director/Elaine R. Offenbach, Sales Associate/Nikki Wilson, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

Client/Server Journal

East: Sherry Driscoll, 375 Cochituate Rd., Box 9171, Framingham, MA 01701-9171, (508) 879-0700 FAX (508) 872-2915

West: Kaye Sharbrough, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

Marketplace Advertising

New England Account Executive/Susan Cardoza, **Mid-Atlantic** Account Executive/Michelle Reeves, **South-Atlantic/Midwest** Account Executive/Kevin Gasper, **Northwest** Account Executive/Andrew Sambrook, **Southwest** Account Executive/Claude Garbarino, Marketing Communications Manager/Karen Lesko, Solutions Directory/Nancy Whittaker, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474 FAX: (508) 820-0941

Recruitment Advertising Sales Offices

Vice President/Recruitment Advertising/John Corrigan, Marketing Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474

New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, Account Executive/Nancy Mack, (800) 343-6474

Mid-Atlantic: Regional Manager/Marty Finn, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Caryn Dlott, (800) 343-6474 TDD: (800) 208-0288

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573 4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (708) 827-4433, Sr. Account Executive/Ellen Cross (800) 343-6474 TDD: (800) 227-9437

West: Regional Manager/Barbara Murphy, 2171 Campus Drive, Ste. 100, Irvine, CA 92715 (714) 250-0164, Sr. Account Executive/Christopher Glenn (800) 343-6474 TDD: (800) 203-5867

Computer Careers Online: Jay Savell, Account Executive, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474

Direct Response Cards

375 Cochicuate Rd., Framingham, MA 01701-9171 (800) 343-6474

East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Manager/Jill Greer, 2171 Campus Drive, Ste. 100, Irvine, CA 92715 (714) 250-0164

Computerworld Database Division

Vice President/General Manager, Customer Information Division: Richard Mikita, Vice President Sales: John Carpenter, Sales Assistant: Jennifer Claus.

East: Account Executive VAR Database, Carol Mullen, Database Representative, Buyers Database, Linda Clinton, (508) 879-0700 FAX: (508) 879-0184

West: Account Executive VAR Database, Chris Jones, Database Representative, Buyers Database, Gena Haas, (415) 347-0555 FAX: (415) 347-8312

Response Technologies

President: Charles Coleman, Chief Operating Officer: Jaye Tyler, (508) 626-1700 FAX: (508) 626-0027, Internet: rti @ delphi.com, CompuServe: 74403,2745

International Data Group

Chairman of the Board, Patrick J. McGovern; **President,** Kelly Conlin; **Chief Operating Officer,** Jim Casella; **Vice President Finance,** William P. Murphy

Computerworld is a publication of International Data Group, the world's largest publisher of computer related information and the leading global provider of information services on information technology. International Data Group publishes over 200computer publications in 63 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S Computerworld Argentina, Infoworld Argentina; AUSTRALIA'S Computerworld Australia, Australian PC World, Australian Macworld, Network World, Mobile Business Australia, Publish!, Reseller, IDG Sources; AUSTRIA'S Computerwelt Oesterreich, PC Test; BELGIUM'S Data News (CW); BOLIVIA'S Computerworld; BRAZIL'S Computerworld, Gamepro, Game Power, Mundo Unix, PC World, Publish, Super Game; BULGARIA'S Computerworld Bulgaria, Ediworld, PC & Mac World Bulgaria, Network World Bulgaria, CANADA'S CIO Canada, Computerworld Canada, Graduate Computerworld, InfoCanada, Network World Canada, Reseller, CHILE'S Computerworld Chile, Informatica, COLOMBIA'S Computerworld Columbia PC World, COSTA RICA'S PC World, CZECH REPUBLIC'S Computerworld, Elektronika, Macworld, PC World, DENMARK'S Communications World, Computerworld Danmark, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Tech World, Windows World, ECUADOR'S PC World; EGYPT'S Computerworld(CW) Middle East, PC World Midde East, FINLAND'S Mikro PC, Tietoviikko, Tietoverkko; FRANCE'S Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux; GERMANY'S Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Electronic Entertainment, Gamepro, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unit, GREECE'S Infoworld, PC Games, HONG KONG'S Computerworld Hong Kong, PC World Hong Kong; HUNGARY'S Computerworld SZT, PC World, INDIA'S Computers & Communications; INDONESIA'S Info Komputer; IRELAND'S ComputerScope, ISRAEL'S Computerworld Israel, PC World Israel; ITALY'S Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC Shopping Italy, PC World Italia; JAPAN'S Computerworld Today, Information Systems World, Macworld Japan, Nikkei Personal Computing, SunWorld Japan, Windows World, KENYA'S East African Computer News; KOREA'S Computerworld Korea, Macworld Korea, PC World Korea; LATIN AMERICA'S GamePro,p MALAYSIA'S Computerworld Malaysia, PC World Malaysia, MEXICO'S Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows, THE NETHERLANDS' Computer! Totaal, Computable (CW), LAN Magazine, MacWorld, Totaal "Windows"; NEW ZEALAND'S Computer Listings, Computerworld New Zealand, Network World, New Zealand PC World, NIGERIA'S PC World Africa, NORWAY'S Computerworld Norge, C/World, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Produkt Guide, Publish & Multimedia World, Student Data, Unix World, Windowsworld; IDG Direct Response; PAKISTAN'S PC World Pakistan, PANAMA'S PC World Panama; PERU'S Computerworld Peru, PC World, PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, China Infoworld, China PC & Communications Magazine, Computer Fan, PC World China, Electronics International, Electronics Today/Multimedia World, Electronic Product World, China Network World, Software World Magazine, Telecom Product World; PHILIPPINES' Computerworld Philippines, PC Digest (PCW), POLAND'S Computerworld Poland, PC World/Komputer; PORTUGAL'S Cerebro/PC World, Correio Informatico/Computerworld, MacIn, ROMANIA'S Computerworld, PC World, Telecom Romania, RUSSIA'S Computerworld-Moscow, Mir PK (PCW), Sety (Networks); SINGAPORE'S Computerworld Southeast Asia, PC World Singapore; SLOVENIA'S Monitor Magazine, SOUTH AFRICA'S Computer Mail (CIO), Computing S.A., Network World S.A., Software World, SPAIN'S Advanced Systems, Amiga World, Computerworld Espana, Communicaciones World, Macworld Espana, NeXTWORLD, Super Juegos Magazine (GamePro), PC World Espana, Publish; SWEDEN'S Attack, ComputerSweden, Corporate Computing, Macworld, Mikrodatorn, Natverk & Kommunikation, PC World, Publishing & Design (CAP), Datalngenjoren, Maxi Data, Windows World, SWITZERLAND'S Computerworld Schweiz, Macworld Schweiz, PC Tip; TAIWAN'S Computerworld Taiwan, PC World Taiwan, THAILAND'S Thai Computerworld, TURKEY'S Computerworld Monitor, Macworld Turkiye, PC World Turkiye; UKRAINE'S Computerworld, UNITED KINGDOM'S Computing/Computerworld, Connexion/Network World, Lotus Magazine, Macworld, Open Computing/Sunworld, UNITED STATES' Advanced Systems, AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Digital Video, DOS Resource Guide, Electronic Entertainment Magazine (E2), Federal Computer Week, GamePro, IDG Books, Infoworld, Laser Event, Macworld, Multimedia World, Network World, PC Letter, PCWorld, PlayRight, Power PC World, Publish, SWATPro, Video Event, VENEZUELA'S Computerworld Venezeula, PC World Venezuela, VIETNAM'S PC World Vietnam

Have a Problem With Your Computerworld Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:
COMPUTERWORLD, P.O. Box 2043, Marion, Ohio 43305-2043.
Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence

Address Changes or Other Changes to Your Subscription
All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line

Your New Address Goes Here Address shown: ☐ Home ☐ Business

Name
Company
Address
City State Zip

Name
Title **Company**
Address
City **State** **Zip**

Other Questions and Problems
It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll free number is available: **1-800-669-1002**. Outside U.S. call 904 382 3322
CompuServe members can reach us at account number 73373,1230

Advertisers' Index

Apple Enterprise Awards	73
AT&T	13
Avalon	9
Bachman	C4
BMC Software	56
Borland	17
Computer Associates	3
CW Client/Server Journal	85
CW Custom Publications	24
CW Object Application Awards	68
Data General	81
Dell	38-39, 112
Digital Equipment Corp.	43
Executive Technology Summit	62
Hewlett Packard	74-75
IBM	29, 60-61
Innovation Data Processing	7
Legent Software	18-19
Lotus Development Corp.	30-31, 34-35
Micom	20
MicroAge	15
Micro Focus	11
Microsoft	22-23
Minolta	10
NEC Technologies	52-53
NetManage	50
Object World	89
Oracle Corp.	5
Parcplace	40
Progress	58-59
Raidtec	84
Santa Cruz Operations	46
SAS Institute	66-67
Siemens Nixdorf	26-27
Software Development '95	48
Speedware	64-65
Sprint	21
Storage Dimensions	76
Symantec	25
Toshiba	44-45
Uniform '95	88
UniKix	115

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Marketplace Advertisers' Index
Pages 102-108

Alicomp, Inc.	(800) 274 5556
American Software	(800) 264 5770
Boxlight	(800) 762 5757
Brixton Systems	(800) BRIXTON
Computer Marketplace	(800) 858 1144
Cybex	(205) 430 4000
Cylink Corp.	(800) 533 2958
Dempsey Business Systems	(800) 888 2000
Faneuil Systems	[illegible]
Knozall	(800) [illegible]
Lodestar Technologies	[illegible]
NC3	[illegible]
NetManage Inc	[illegible]
Panelight	(800) 726 3590
Secure It	[illegible]
Server Technology	[illegible]
Spectra Equipment	[illegible]
Trimac	[illegible]

Companies in this issue

Page number refers to page on which story begins

A

A. O. Smith Automotive Products, Inc. ... 12
Aberdeen Group ... 1,6,20
Accel Partners ... 33
Acer America Corp. ... 44
Adobe Systems, Inc. ... 44,86
Advanced Logic Research, Inc. ... 44
Advanced Micro Devices, Inc. ... 6
AER, Inc. ... 10
Alcan Aluminum Corp. ... 4
Allen Communication, Inc. ... 65
Allied Signal, Inc. ... 69
Amdahl Corp. ... 1,33,78
America Online, Inc. ... 6,33,51
American Cyanamid Co. ... 1
American Express Co. ... 1
American Home Products ... 24
American Paging, Inc. ... 32
Ameritech Corp. ... 24
Ameritrust ... 47
Amoco Corp. ... 6,24
AMR Corp. ... 15
Andersen Consulting ... 6,60
Annex Research ... 8
Apple Computer, Inc. ... 1,8,12,41,55,63,86
Ardis Co. ... 6
ASCII Corp. ... 64
AST Research, Inc. ... 41
AT&T Corp. ... 14,42
AT&T Global Information Solutions ... 102
Atre Associates, Inc. ... 4
Augur Visions, Inc. ... 102
Avid Technology, Inc. ... 44

B

Belkin Components ... 49
Bell Atlantic Corp. ... 8
Big Sky Technologies ... 47
BIS Strategic Decisions ... 12
Bolt Beranek and Newman, Inc. ... 12
Borland International, Inc. ... 6,65,91
Boston Edison Co. ... 51
BSG ... 92
Burlington Coat Factory Warehouse Corp. ... 12
Business Matters, Inc. ... 63
Business Tools, Inc. ... 65

C

C L King & Associates ... 32
Cadre Technologies, Inc. ... 8
CAE Electronics Ltd. ... 1
Cap Gemini America, Inc. ... 1,71
Capital One Financial Services Corp. ... 1
Carnegie Mellon University ... 12,54
Caterpillar, Inc. ... 24
CDB Research & Consulting, Inc. ... 71
CDI Corp. ... 32
CDPD Forum, Inc. ... 15
Chemical Banking Corp. ... 47
Chevron Information Technology Co. ... 69
Children's Hospital ... 15
Chrysler Corp. ... 32
Cincom Systems, Inc. ... 4
Cisco Systems, Inc. ... 51,55
Citibank NA ... 1
Claritas, Inc. ... 44
Cognos Corp. ... 63
Color Me Beautiful, Inc. ... 57
Compagnie des Machines Bull ... 1
Compaq Computer Corp. ... 4,6,33 ... 102,111,113
Compression Labs, Inc. ... 32
CompuServe, Inc. ... 33,51
Computer Associates International, Inc. ... 1,16,91
Computer Intelligence InfoCorp ... 102
Compuware Corp. ... 64
Creative Strategies International, Inc. ... 12
Crescent Software, Inc. ... 63
CSX Corp. ... 33,113
CyberCash, Inc. ... 54
Cygnus Support ... 44
Cyrix Corp. ... 41

D

Data General Corp. ... 83
Dataquest, Inc. ... 7,15,41,102
Decisis, Inc. ... 51
Dell Computer Corp. ... 6,41
Deloitte & Touche ... 8
Digital Equipment Corp. ... 1,12,15,32,42 ... 55,83,86,87
Disk/Trend, Inc. ... 102
Dominion Textile ... 63
Donaldson Lufkin & Jenrette, Inc. ... 57
Dynatech Communications, Inc. ... 55
Dynatech Corp. ... 55

E

Eastman Kodak Co. ... 57
Eclipse Technology ... 63
Eicon Technology Corp. ... 54
Electronic Data Systems Corp. ... 6,69,92
EMC Corp. ... 1,77,80,82,83,113
Encore Computer Corp. ... 1
Equifax, Inc. ... 71
ExecuSoft Systems, Inc. ... 61

F

FedEx Corp. ... 15
Fibronics International, Inc. ... 32
Fireman's Fund Insurance Co. ... 51,69
First Mississippi Corp. ... 1
Ford Motor Co. ... 32
Fore Systems, Inc. ... 32
Forrester Research, Inc. ... 33,51
Fulcrum Technologies, Inc. ... 33

G

Gartner Group, Inc. ... 1,64
Gateway 2000, Inc. ... 6
General Accident Insurance of America ... 1
General Electric Co. ... 69
General Health Practice Management, Inc. ... 41,44
General Motors Corp. ... 24,32
Georgia-Pacific Corp. ... 69
Golden Systems, Inc. ... 111
Goldstar ... 32
Gupta Corp. ... 8,33

H

Halliburton Energy Services ... 60
Harbinger EDI Services, Inc. ... 33
Hewlett-Packard Co. ... 1,8,12,14,20 ... 32,55,83,102
Hitachi Data Systems Corp. ... 78,113
Hitachi Ltd. ... 64
Howard Rubin and Associates ... 82
Hurwitz Consulting Group, Inc. ... 63

I

I-Net, Inc. ... 60
IBM ... 1,7,8,12,14,32,33,51,55 ... 57,61,63,64,65,77,80,82,83,86,102
IBM PC Co. ... 41
Information Specialists Ltd. ... 63
Informix Corp. ... 64
Intel Corp. ... 1,6,8,41,42,44
InterGroup Technologies ... 63
Interleaf, Inc. ... 10
International Computer Negotiations, Inc. ... 1
International Data Corp. ... 6,41,44,63,64 ... 77,80,82,83,113
Intuit, Inc. ... 6

J

J. D. Edwards & Co. ... 61

K

Kansas City Southern Railway Co. ... 33,57
Keitz Investment Management ... 111
Ki Networks, Inc. ... 12
Knowledge Era Enterprises, Inc. ... 69
Komatsu Ltd. ... 32

L

Lannet Data Communications Ltd. ... 32
Lexicus Corp. ... 65
LGS Group, Inc. ... 1
LinkAge Office Information Solutions, Inc. ... 20
Liposome Technology, Inc. ... 1
Locus Computing Corp. ... 49
Lotus Development Corp. ... 1,6,20,33 ... 47,55,63,86
Louis Harris and Associates, Inc. ... 71

M

Make Systems, Inc. ... 51,55
Matrox Electronics Systems Ltd. ... 113
McCaw Cellular Communications, Inc. ... 15
McConnell Consulting Co. ... 51
MEMC Electronic Materials, Inc. ... 57
Mentis Corp. ... 71
Merrill Lynch & Co. ... 60,71
Meta Group, Inc. ... 1
MetaWare, Inc. ... 44
Metricom, Inc. ... 55
Micom Communications Corp. ... 55
Micro Focus, Inc. ... 64
Micro Technology, Inc. ... 83
Microsoft Corp. ... 1,6,7,8,10,20,33,42 ... 44,51,55,63,65,86,87,91
Mitre Corp. ... 86
Mobil Research & Development Corp. ... 24
Monsanto Co. ... 12
Motorola, Inc. ... 14
Motorola Israel Ltd. ... 32
MultiTasking Systems, Inc. ... 63
Mystic River Software ... 63

N

National City Corp. ... 57
NEC Corp. ... 41
NEC Technologies, Inc. ... 41,44
NetFrame Systems, Inc. ... 102
NetLabs, Inc. ... 55
Netscape Communications Corp. ... 10
Network Systems Corp. ... 8
Nexus Telecommunication Systems Ltd. ... 32
North Pacific Insurance Co. ... 1
Northpoint Software ... 49
Novell, Inc. ... 1,6,7,42,55,63,86,102

O

Objectshare Systems, Inc. ... 65
Occidental Petroleum ... 8
Ogden Corp. ... 57
Olsten Corp. ... 71
Open Source Solutions, Inc. ... 1
OpenVision Technologies, Inc. ... 12
Oracle Corp. ... 1,6,7,8,63
Orckit Communications Ltd. ... 32
Ositech Communications, Inc. ... 44

P

Pacific Bell ... 12
Pacific Communication Sciences, Inc. ... 6
Paging Network, Inc. ... 55
Palladio Software Corp. ... 33
Paradyne, Inc. ... 42
PECO Energy Co. ... 6
Pencom Systems, Inc. ... 92
People Software Concepts ... 69
Pepsico Foods International ... 14
Performance Computing, Inc. ... 4
Personal Library Software, Inc. ... 55
Placer Dome Canada Ltd. ... 14
Planar Systems, Inc. ... 111
Platinum Technology, Inc. ... 64
Power Computing Co. ... 60
Powersoft Corp. ... 63,64,91
Premia Corp. ... 65
Primary Rate, Inc. ... 55
Progress Software Corp. ... 63
Pyramid Technology Corp. ... 32

R

Racotek, Inc. ... 6
Ram Mobile Data USA L.P. ... 6
Rapport Communications ... 20
Rational Software Corp. ... 33
RCR Publications, Inc. ... 55
RDI Computer Corp. ... 8
Revelation Technologies, Inc. ... 65
Robertson, Stephens ... 1
Rolls-Royce Canada Ltd. ... 1

S

Salomon Brothers, Inc. ... 33
Sapiens USA, Inc. ... 32
Shaw Data Service ... 55
SHL Systemhouse, Inc. ... 6,64
Siemens/Nixdorf Informationssysteme AG ... 32
Signet Banking Corp. ... 71
Silicon Graphics, Inc. ... 1,8,10,44
Simpact Associates ... 47
Socket Communications, Inc. ... 55
Soffront Software, Inc. ... 65
SoftSwitch, Inc. ... 20
Software AG of North America, Inc. ... 64
Spectrum Information Technologies, Inc. ... 8
Spry, Inc. ... 51
Spyglass, Inc. ... 33
Stampede Technologies, Inc. ... 15
Star Cutter Co. ... 4
Storage Technology Corp. ... 1,8,33,77,80,113
Strategic Network Consulting ... 55
Stratus Computer, Inc. ... 33
Summagraphics Corp. ... 44
Sun Company, Inc. ... 1
Sun Microsystems Computer Corp. ... 8
Sun Microsystems, Inc. ... 8,10,14
SunSoft, Inc. ... 12
Sybase, Inc. ... 1,63
Symantec Corp. ... 64
Sync Research, Inc. ... 49
Systematics Information Services, Inc. ... 92

T

T3plus Networking, Inc. ... 54
Taligent, Inc. ... 86
Texaco, Inc. ... 49
Texas Commerce Bank NA ... 47
Texas Instruments, Inc. ... 1,33,41
The Conneighton Group, Inc. ... 14
The Darby Group Co. ... 42
Tivoli Systems, Inc. ... 33
Toshiba America Information Systems, Inc. ... 6,41
Tri-Star Computer Corp. ... 44
Tricord Systems, Inc. ... 102
Trimble Navigation System, Inc. ... 41
Trinzie Corp. ... 8
Tseng Labs, Inc. ... 113

U

Unisql, Inc. ... 4
Unisys Corp. ... 8,71
United Parcel Service, Inc. ... 6
Unocal Corp. ... 12
UUNet Technologies, Inc. ... 33

V

Valmet's Procons Data Corp. ... 1
Van Kasper & Co. ... 111
Vanguard Communications ... 47
ViewStar Corp. ... 47

W

Walter Oney Software ... 49
Wellfleet Communications, Inc. ... 55
Wells Fargo Bank ... 54
Wheelabrator Technologies, Inc. ... 57
WordPerfect ... 86
WorkGroup Technologies, Inc. ... 41

X

X/Open Co. ... 12
XDB Systems ... 64
Xerox Corp. ... 8,69
XL/Datacomp, Inc. ... 83

Z

Zeitz and Associates ... 1

Jan. 27 Stock Ticker

Gainers / Losers

Percent

Gainers		Losers	
Intelligent Info. Systems	48.8	Network Systems Corp.	-31.7
Software Spectrum Inc.	32.8	Storage Technology	-30.3
Penril Data Comm Networks	31.4	Stratus Computer Inc.	-27.2
CE Software	23.1	Software Publishing Corp.	-22.6
Compression Labs Inc.	17.2	Printronix Inc.	-18.1
Intergraph Corp.	15.7	Ross Systems	-17.5
Radius Inc.	13.9	Legent Corp.	-16.3
Cognitronics Corp.	13.5	Trinzic Corp.	-13.4

Dollar

Gainers		Losers	
Software Spectrum Inc.	5.25	Stratus Computer Inc.	-10.63
Bell Atlantic Corp.	4.13	Storage Technology	-9.50
Lotus Development	3.75	Legent Corp.	-5.88
U S West Inc.	3.50	Compaq Computer Corp.	-5.38
Bellsouth Corp.	3.38	US Robotics (H)	-4.63
GTE Corp.	3.00	Printronix Inc.	-4.13
LSI Logic Corp.	2.50	Compuware Corp.	-4.06
Nynex Corp.	2.38	Dell Computer Corp.	-4.00

[redacted]

Where are they now?

One year after initial public offerings (IPO) in the technology sector began to decline, how have the companies that succeeded in making deals in the fourth quarter of 1993 fared?

While most of the companies closed last Friday at the same or close to their IPO price, two stand out in particular for their dramatic change in value.

Beaverton, Ore.-based **Planar Systems, Inc. (PLNR)**, for example, has more than tripled in value since it went public. The company is involved in the development and manufacture of electroluminescent (EL) flat-panel displays. According to Stephen Lidberg, a securities analyst at "Red Chip Review," a newsletter in Portland, Ore., EL is an underrecognized technology that poses a strong threat to LCDs, which have been in continuous short supply.

"A year ago people didn't quite understand the potential impact of EL," Lidberg said. "It's brighter and more rugged than LCD so it has much broader applications in industry. Planar's market for this unique technology is huge and growing."

Not so golden days

On the other end, **Golden Systems, Inc. (GLDN)** in Simi Valley, Calif., a maker of power supply units, plummeted to 25 cents a share from its initial offering of $7 per share. Compaq Computer Corp. delivered the fatal blow when it rejected a contract for $5 million worth of the company's product because of a manufacturing flaw.

There's more than a glimmer of hope for Golden on the horizon, however, said Ian Gilson, an analyst at Van Kasper & Co. in San Francisco. "Golden has been sick but is very alive and in the recovery room," he said, adding that Compaq has agreed to take back the reworked product. He also said there are reportedly several agreements pending with other large companies.

It comes as no surprise that most of the IPOs saw little or no growth, according to Michael Keitz, vice president of Keitz Investment Management in Philadelphia. "Only about 25% to 30% of IPOs are above their initial offering price two years later," Keitz said. —*Erin Callaway*

IPO-lar opposites

THESE COMPANIES WERE ABLE TO CAPTURE INVESTORS' ATTENTION IN 1993'S FOURTH-QUARTER IPO DROUGHT; ONE YEAR LATER, THEY ARE ON OPPOSITE ENDS OF THE SPECTRUM.

Company	IPO price	Today's price
Golden Systems, Inc.	7	1 7/16
Planar Systems, Inc.	7	24 1/8

Communications and Network Services — UP 0.16%

Exch	52-Week Range			Jan. 27 3 PM	Wk Net Change	Wk Pct Change
OTC	53.25	20.13	3 COM Corp.	47.25	-1.88	-3.8
NYS	44.13	36.25	AMERITECH Corp.	44.13	1.38	3.2
NYS	57.13	47.25	AT&T	49.75	0.88	1.8
OTC	19.75	12.75	Banyan Systems Inc.	16.88	-1.38	-7.5
OTC	43.88	18.63	Bay Networks Inc.	29.63	-1.25	-4.0
NYS	58.38	48.38	Bell Atlantic Corp.	54.88	4.13	8.1
NYS	63.50	50.50	Bellsouth Corp.	58.25	3.38	6.2
NYS	21.50	10.00	Bolt, Beranek & Newman	16.00	0.25	1.6
OTC	15.75	9.00	Brooktrout Technology	11.13	0.38	3.5
NYS	53.00	33.06	Cabletron Systems	40.00	-2.38	-5.6
OTC	43.00	10.00	Centigram Communications	14.00	1.25	9.8
OTC	50.50	21.00	Chipcom Corp.	42.63	-1.63	-3.7
OTC	40.75	18.75	Cisco Systems Inc.	33.75	-1.38	-3.9
OTC	14.38	6.13	Compression Labs Inc.	8.50	1.25	17.2
OTC	12.38	5.13	Computer Network Tech.	6.63	0.13	1.9
OTC	25.75	7.50	CrossComm	13.25	0.00	0.0
OTC	3.50	2.00	Data Switch Corp.	3.19	-0.06	-1.9
OTC	38.25	17.88	DSC Communications	33.38	-3.00	-8.2
OTC	71.50	20.00	FORE Systems Inc.	64.75	-2.50	-3.7
NYS	35.88	10.00	General Datacomm Inds.	24.75	-3.75	-13.2
NYS	34.75	29.50	GTE Corp.	34.00	3.00	9.7
NYS	95.97	77.00	ITT Corp.	89.75	-1.00	-1.1
OTC	27.88	17.25	MCI Commmunications Corp.	17.88	-0.75	-4.0
OTC	15.75	7.63	MICOM Communications Corp.	8.00	0.00	0.0
OTC	12.63	4.50	Microcom Inc.	11.13	-0.13	-1.1
OTC	10.50	4.00	Netrix Corp.	9.63	0.00	0.0
OTC	8.75	3.25	Network Computing Devices	4.25	-0.50	-10.5
NYS	27.75	7.38	Network Equipment Tech.	24.25	-0.63	-2.5
OTC	27.13	13.88	Network General	25.25	0.75	3.1
OTC	9.50	5.38	Network Systems Corp.	5.38	-2.50	-31.7
NYS	68.75	26.50	Newbridge Networks Corp.	37.50	0.75	2.0
NYS	37.75	26.00	Northern Telecom Ltd.	34.63	1.63	4.9
OTC	26.63	13.38	Novell Inc.	18.00	-0.31	-1.7
NYS	41.38	33.25	Nynex Corp.	38.75	2.38	6.5
OTC	30.00	15.50	Octel Communications Corp.	21.50	0.63	3.0
OTC	36.25	10.75	Optical Data Systems Inc.	33.50	-0.50	-1.5
OTC	7.50	2.13	Penril Data Comm Networks	2.88	0.69	31.4
OTC	26.13	10.00	Picturetel Corp. (H)	24.00	-1.25	-5.0
OTC	8.13	2.13	Proteon Inc. (H)	7.63	-0.13	-1.6
OTC	14.38	2.75	Racotek Inc.	3.50	0.13	3.7
OTC	11.00	3.75	Retix	3.88	0.00	0.0
NYS	23.25	12.44	Scientific Atlanta Inc.	19.88	0.13	0.6
NYS	44.38	36.75	Southwestern Bell Corp.	42.88	2.00	4.9
NYS	40.13	25.88	Sprint Corp.	28.50	1.00	3.6
OTC	31.50	13.38	Standard Microsystems Corp.(H)	30.00	0.13	0.4
OTC	43.25	6.50	Stratacom Inc.	36.63	-1.00	-2.7
OTC	15.25	3.88	Telebit Corp.	5.00	-0.13	-2.4
OTC	55.25	24.00	US Robotics (H)	48.25	-4.63	-8.7
NYS	44.88	34.63	U S West Inc.	39.13	3.50	9.8
OTC	28.25	12.75	Xircom	15.88	-0.13	-0.8
OTC	27.00	8.00	Xylogics Inc.	25.25	0.50	2.0

PCs and Workstations — OFF 6.84%

Exch	52-Week Range			Jan. 27 3 PM	Wk Net Change	Wk Pct Change
OTC	7.50	3.50	Advanced Logic Research	4.88	-0.50	-9.3
OTC	48.00	24.63	Apple Computer Inc.	39.75	-3.25	-7.6
OTC	33.00	10.38	AST Research Inc.	14.25	-1.25	-8.1
NYS	44.38	27.78	Compaq Computer Corp.	36.00	-5.38	-13.0
OTC	47.75	19.13	Dell Computer Corp.	41.50	-4.00	-8.8
OTC	25.25	9.25	Gateway 2000 Inc.	22.00	-2.38	-9.7
NYS	107.38	71.88	Hewlett Packard Co.	102.13	-2.63	-2.5
NYS	33.88	18.75	Silicon Graphics (H)	30.38	-2.63	-8.0
OTC	37.63	18.25	Sun Microsystems Inc.	32.38	-0.63	-1.9
NYS	52.38	30.75	Tandy Corp.	45.63	-3.13	-6.4
OTC	11.75	2.38	Zeos International Ltd.	10.00	0.00	0.0

Large Systems — OFF 5.56%

Exch	52-Week Range			Jan. 27 3 PM	Wk Net Change	Wk Pct Change
ASE	12.00	5.25	Amdahl Corp.	10.38	-1.00	-8.8
NYS	8.88	4.38	Convex Computer	7.25	-0.38	-4.9
OTC	2.75	0.50	Cray Computer	1.25	-0.09	-7.0
NYS	33.75	14.63	Cray Research Inc.	14.88	-1.38	-8.5
NYS	12.00	6.63	Data General Corp.	8.75	-0.25	-2.8
NYS	38.75	18.25	Digital Equipment Corp.	32.00	-3.13	-8.9
OTC	6.38	2.44	Encore Computer Corp.	2.75	-0.38	-12.0
OTC	17.50	6.50	Harris Computer Systems Cor	12.25	-0.50	-3.9
NYS	77.25	51.38	IBM	71.75	-3.50	-4.7
OTC	17.25	5.00	NetFrame	5.88	-0.50	-7.8
OTC	13.75	3.63	Parallan Computer	5.38	-0.13	-2.3
OTC	16.00	5.38	Pyramid Technology	15.75	0.88	5.9
OTC	21.25	11.13	Sequent Computer Sys.	17.00	-1.88	-9.9
OTC	6.84	3.13	Sequoia Systems Inc.	3.75	0.06	1.7
NYS	39.88	22.88	Stratus Computer Inc.	28.38	-10.63	-27.2
NYS	19.75	10.50	Tandem Computers Inc.	17.75	-0.63	-3.4
OTC	23.50	3.88	TriCord Systems	6.00	0.25	4.3
NYS	16.50	8.25	Unisys Corp.	9.00	0.00	0.0

Software — OFF 1.70%

Exch	52-Week Range			Jan. 27 3 PM	Wk Net Change	Wk Pct Change
OTC	38.50	21.50	Adobe Systems Inc.	30.13	-0.13	-0.4
OTC	6.38	2.50	American Software Inc.	2.75	0.00	0.0
OTC	41.50	21.88	Autodesk Inc.	33.50	-0.13	-0.4
OTC	4.13	1.75	Bachman Info. Systems	4.13	-0.25	-5.7
OTC	29.00	20.50	BGS Systems Inc.	24.50	-0.38	-1.5
OTC	71.00	40.25	BMC Software Inc.	56.69	-2.75	-4.6
OTC	27.75	15.00	Boole & Babbage (H)	27.75	0.75	2.8
OTC	15.13	6.00	Borland Int'l Inc.	7.38	-0.50	-6.3
OTC	24.25	6.00	Brock Control Systems Inc.	6.25	-0.50	-7.4
OTC	4.00	1.78	CE Software	3.00	0.56	23.1
ASE	30.34	6.25	Cheyenne Software Inc.	14.38	-0.75	-5.0
OTC	18.88	9.75	Cognos Inc.	17.00	-0.25	-1.4
NYS	55.00	27.38	Computer Associates (H)	51.63	-1.50	-2.8
NYS	5.38	2.50	Computervision Corp.	4.88	0.25	5.4
OTC	49.25	25.00	Compuware Corp.	37.06	-4.06	-9.9
OTC	17.25	9.00	Comshare Inc. (H)	16.00	1.25	8.5
OTC	16.75	10.66	Corel Corp.	11.13	-1.50	-11.9
OTC	14.25	7.25	Dataware Technologies Inc.	11.50	0.00	0.0
OTC	6.75	2.25	Easel Corp.	3.63	-0.25	-6.5
OTC	32.00	14.25	Filenet Corp. (H)	30.75	2.25	7.9
OTC	21.25	3.00	4th Dimension	4.25	0.03	0.7
OTC	19.25	8.13	Frame Technology	18.50	0.00	0.0
OTC	35.25	11.50	FTP Software Inc.	28.00	-3.00	-9.7
OTC	11.00	7.00	Group I Software	9.25	0.00	0.0
OTC	31.75	6.75	Gupta	11.75	-0.75	-6.0
OTC	10.88	5.13	Hogan Systems Inc.	6.00	-0.38	-5.9
OTC	40.50	18.00	IMRS	36.88	-2.13	-5.4
OTC	39.75	11.25	Information Resources	14.75	0.00	0.0
OTC	33.25	14.25	Informix Corp.	31.38	0.38	1.2
OTC	11.25	7.38	Intergraph Corp.	10.13	1.38	15.7
OTC	8.75	2.50	Interleaf Inc.	4.13	0.25	6.5
OTC	18.25	8.63	Intersolv Inc.	14.50	-1.13	-7.2
OTC	73.25	27.00	Intuit Inc.	65.50	-1.75	-2.6
OTC	37.25	19.00	Legent Corp.	30.25	-5.88	16.3
OTC	86.50	29.75	Lotus Development	44.63	3.75	9.2
OTC	17.75	4.38	Magic Software Enterprises	4.88	-0.25	4.9
OTC	15.50	6.00	Manugistics Group Inc.	8.75	-0.63	-6.7
OTC	27.50	14.75	MapInfo Corp.	25.25	1.00	4.1
OTC	6.88	1.44	MathSoft	2.25	0.13	-5.3
OTC	20.25	6.50	McAfee Associates	16.63	2.13	-11.3
OTC	17.25	9.38	Mentor Graphics	13.75	-0.13	-0.9
OTC	20.00	11.50	Micro Focus	13.63	0.75	5.8
OTC	11.63	4.63	Micrografx Inc.	6.63	-0.75	-10.2
OTC	65.25	39.00	Microsoft Corp.	59.75	-2.13	-3.4
OTC	45.00	11.25	NetManage Inc.	41.25	2.25	5.8
OTC	46.50	26.25	Oracle Corp.	42.56	1.44	-3.3
OTC	40.25	21.50	Parametric Technology	38.25	-0.63	-1.6
OTC	24.50	13.38	ParcPlace Systems Inc.	18.00	-1.06	-5.6
OTC	39.50	13.00	Peoplesoft	31.63	-3.63	-10.3
OTC	8.50	4.13	Phoenix Technologies	7.44	-0.56	-7.0
OTC	87.25	35.50	Powersoft	71.45	-3.80	-5.0
OTC	14.75	3.50	Platinum Software	9.38	0.25	2.7
OTC	24.25	10.00	Platinum Technology	22.75	-0.63	-2.7
OTC	56.75	27.00	Progress Software Corp.	48.75	1.50	3.2
OTC	4.13	1.88	Quarterdeck Office Sys.	3.38	-0.03	-0.9
OTC	24.00	9.50	Rainbow Technologies Inc.	15.50	0.50	3.3
OTC	9.25	2.00	Rasterops	3.75	-0.25	-6.3
OTC	7.13	2.88	Ross Systems	4.13	-0.88	-17.5
OTC	20.50	0.50	Sapiens Intl. Corp. N.V.	1.13	0.03	2.9
OTC	27.25	9.75	Softkey International Inc.	24.88	1.38	5.9
OTC	7.75	3.00	Software Publishing Corp.	4.06	-1.19	-22.6
OTC	10.00	5.00	State of the Art	9.00	-0.44	-4.6
NYS	38.38	25.00	Sterling Software Inc.	36.00	-0.50	-1.4
OTC	16.50	3.63	Struct. Dynamics Research	6.50	-0.25	-3.7
OTC	57.00	35.25	Sybase Inc.	44.88	-2.63	-5.5
OTC	21.13	9.88	Symantec Corp.	20.00	1.00	5.3
OTC	50.50	33.00	SynOpsys	45.75	-1.50	-3.2
OTC	18.00	10.63	System Software Assoc.	17.13	0.25	1.5
OTC	6.13	3.25	Trinzic Corp.	5.25	-0.81	-13.4
OTC	30.00	7.88	ViewLogic Systems	9.63	1.13	13.2
OTC	23.25	12.25	VMark Software Inc.	18.50	1.00	5.7
OTC	13.25	5.50	Walker Interactive Systems	8.00	0.38	4.9
OTC	60.00	29.25	Wall Data Inc.	38.00	1.75	4.8

Semiconductors — OFF 1.40%

Exch	52-Week Range			Jan. 27 3 PM	Wk Net Change	Wk Pct Change
NYS	32.25	20.13	Advanced Micro Devices	30.13	-1.38	-4.4
NYS	24.50	16.34	Analog Devices Inc.	21.25	-0.88	-4.0
OTC	37.63	17.94	Atmel Corp.	33.00	-0.25	-0.8
OTC	8.88	3.63	Chips and Technologies	7.00	-0.88	-11.1
OTC	44.63	21.00	Cirrus Logic	28.13	2.25	8.7
NYS	26.88	13.88	Cypress Semiconductor Corp.	23.75	-1.88	-7.3
NYS	20.13	13.38	Dallas Semiconductor	15.63	0.25	1.6
OTC	31.50	14.75	Integrated Silicon Systems	27.50	-0.75	-2.7
OTC	73.50	56.00	Intel Corp.	71.25	1.88	2.7
NYS	45.38	16.75	LSI Logic Corp.	43.88	2.50	6.0
OTC	22.75	14.25	Lattice Semiconductor (H)	22.75	1.13	5.2
NYS	47.50	22.75	Micron Technology (H)	45.00	-0.50	-1.1
NYS	63.13	42.13	Motorola Inc.	60.13	-1.25	-2.0
NYS	25.00	14.38	National Semiconductor	18.13	-1.25	-6.5
OTC	18.75	6.75	Sierra Semiconductor	18.13	0.88	5.1
NYS	89.50	63.25	Texas Instruments	70.25	-3.38	-4.6
OTC	16.38	10.25	VLSI Technology	12.88	-0.38	-2.8
OTC	9.50	1.78	Weitek	2.44	-0.19	-7.1
ASE	20.38	11.38	Western Digital Corp.	15.63	-0.38	-2.3
OTC	63.75	29.00	Xilinx	59.75	0.50	0.8
OTC	37.75	24.75	Zilog Inc.	29.25	-0.88	-2.9

Peripherals and Subsystems — OFF 1.01%

Exch	52-Week Range			Jan. 27 3 PM	Wk Net Change	Wk Pct Change
OTC	30.50	14.50	American Power Conversion	15.63	-0.25	-1.6
OTC	27.25	17.25	Banctec Inc. (L)	18.13	0.13	0.7
OTC	5.75	3.25	Cambex Corp.	3.75	0.13	3.4
ASE	5.00	1.38	Cognitronics Corp.	2.63	0.31	13.5
NYS	20.50	9.00	Conner Peripherals	10.88	-0.13	-1.1
OTC	24.00	9.75	Creative Technologies Inc.	13.38	0.88	7.0
OTC	11.00	3.50	Data Race Inc.	7.00	-0.38	-5.1
ASE	8.50	4.13	Dataram Corp.	7.00	0.13	1.8
NYS	24.00	12.38	EMC Corp.	18.13	-1.88	-9.4
OTC	15.00	3.13	Emulex Corp.	13.06	-0.44	-3.2
OTC	21.00	11.25	Evans & Sutherland	13.00	0.00	0.0
OTC	24.00	14.00	Exabyte	18.25	0.25	1.4
OTC	24.25	1.88	Intelligent Info. Systems	3.81	1.25	48.8
OTC	5.50	1.59	Iomega Corp.	4.75	-0.06	-1.3
OTC	9.75	2.00	IPL Systems Inc.	2.50	-0.38	-13.0
OTC	29.50	17.00	Komag Inc.	24.25	-2.75	-10.2
OTC	8.63	2.63	Maxtor Corp.	5.50	-0.25	-4.3
OTC	11.50	4.88	Micropolis Corp. (H)	9.88	-0.38	-3.7
OTC	20.25	9.25	Pinnacle Micro Inc.	12.50	0.50	4.2
OTC	28.75	4.31	Printronix Inc.	18.63	-4.13	-18.1
NYS	10.75	6.88	QMS Inc.	8.38	-0.13	-1.5
OTC	20.25	11.63	Quantum Corp.	14.25	-0.88	-5.8
OTC	18.25	7.38	Radius Inc.	14.38	1.75	13.9
NYS	14.63	6.38	Recognition International	8.00	0.00	0.0
OTC	7.00	4.13	Rexon Inc. (H)	6.25	-0.31	-4.8
OTC	28.75	18.63	Seagate Technology	25.50	-1.00	-3.8
NYS	41.50	21.88	Storage Technology	21.88	-9.50	-30.3
NYS	40.50	24.88	Tektronix Inc.	34.50	2.75	-7.4
NYS	112.75	90.63	Xerox Corp.	104.13	0.50	0.5

Services — UP 0.67%

Exch	52-Week Range			Jan. 27 3 PM	Wk Net Change	Wk Pct Change
OTC	19.88	12.06	American Mgmt. Systems	18.13	0.50	2.8
NYS	4.25	1.75	Anacomp Inc.	1.88	0.00	0.0
OTC	21.75	14.50	Analysts Int'l	20.50	-0.25	-1.2
NYS	61.63	47.63	Auto Data Processing	58.75	0.00	0.0
OTC	24.25	14.00	Cambridge Tech. Partners	23.00	0.00	0.0
NYS	28.88	20.50	Ceridian Corp. (H)	28.63	0.00	0.0
NYS	25.13	17.75	Comdisco Inc. (H)	25.13	1.25	5.2
OTC	18.00	8.25	Computer Horizons	16.50	-0.50	-2.9
NYS	52.63	34.25	Computer Sciences	48.88	0.88	1.8
NYS	10.38	6.75	Computer Task Group	8.63	0.00	0.0
NYS	22.25	6.75	CompUSA Inc.	17.38	0.63	3.5
OTC	11.38	5.38	Control Data Systems Inc.	6.63	0.50	8.2
OTC	12.13	6.13	Egghead Discount Software	11.00	0.50	4.8
NYS	39.50	28.88	General Motors E (EDS)	38.13	0.25	0.7
OTC	21.00	6.88	Inacom Corp.	8.38	0.00	0.0
OTC	27.50	7.50	Intelligent Electronics	9.50	-0.56	5.6
OTC	22.50	6.25	Merisel	6.75	0.50	6.9
OTC	32.50	9.25	Microage Inc.	11.88	-0.13	1.0
OTC	42.00	28.50	Paychex	39.25	-1.25	3.1
NYS	47.75	25.75	Policy Management Sys	41.00	1.00	2.4
NYS	28.25	19.75	Reynolds and Reynolds	24.00	0.38	1.5
OTC	25.25	16.75	SEI Corp.	17.75	1.25	[illegible]
OTC	34.63	22.13	Shared Medical Systems (H)	32.88	1.50	[illegible]
OTC	8.13	4.00	SHL Systemhouse	[illegible]	0.06	[illegible]
OTC	21.25	9.25	Software Spectrum Inc.	21.25	5.25	[illegible]

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

Copyright Nordby International Inc., Boulder, Colorado

This information is based on sources believed to be reliable, and while extensive efforts are made to assume its accuracy, no guarantees can be made. [illegible] International and Computerworld assume no liability for any inaccuracies. For information on Nordby's customized financial research services, [illegible] 1 [illegible] 926-7404.

Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385697. Computerworld (ISSN 0010-4841) is published weekly: except a single combined issue for the last week in December a[illegible]d the first week [illegible] by Computerworld, Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1994 by Computerworld, Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 481[illegible] Co[illegible] indexed. Back issues, if available, may be purchased through the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by Computerworld, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, Computerworld, Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $6.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $150 (surface) a year; Europe — $295 a year; all other countries — $295 a year. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

WHO'S THE LEADER IN
PENTIUM™ CHIP SYSTEMS?
(IT'S NOT WHO YOU THINK IT IS.)
"Dell is a major force in the industry's transition to the Pentium processor."
—ANDREW S. GROVE, PRESIDENT & CEO, INTEL

According to a recent report from Workgroup Technologies,^ Dell shipped more Pentium™ chip systems worldwide during 1994 than either IBM or Compaq.

We offer a full line of OptiPlex™ Pentium processor-based systems. And we're committed to offering reliable Pentium processor-based systems. In fact, every Pentium processor-based OptiPlex system we sell now has the updated Pentium processor. All of which ensures you a platform ready for powerful new applications, like Windows95, when they arrive.

So call us. Because it's smart business to move to Pentium chip systems. And even smarter business to move to Dell.

OPTIPLEX™

UPDATED
PENTIUM™ PROCESSORS

DELL® OPTIPLEX 560/L
60MHz PENTIUM PROCESSOR
- 8MB RAM/270MB Hard Drive
- VS14 Monitor (14" CRT, .28mm)
- Guaranteed Compatibility*
- 3 Year Warranty†

$1749
Product Code #300247

DELL OPTIPLEX XL 575
75MHz PENTIUM PROCESSOR
- 8MB RAM/540MB Hard Drive
- VS14 Monitor (14" CRT, .28mm)
- Guaranteed Compatibility*
- 3 Year Warranty†

$2179
Product Code #300275

DELL OPTIPLEX XL 590
90MHz PENTIUM PROCESSOR
- 16MB RAM/540MB Hard Drive
- VS14 Monitor (14" CRT, .28mm)
- Guaranteed Compatibility*
- 3 Year Warranty†

$2795
Product Code #300293

DELL®

(800) 765-4458 MONDAY-FRIDAY 7AM-9PM CT • SATURDAY 10AM-6PM CT • SUNDAY 12PM-5PM CT
KEYCODE #12018 • CANADA* CALL 800-387-5755 • MEXICO CITY* CALL 800-228-7811

intel inside
pentium
PROCESSOR

*If you encounter a compatibility problem within three years after the original purchase, we guarantee that Dell's engineers and technicians will work with you to identify the cause and recommend a solution. For a complete copy of our limited compatibility guarantee, contact Dell at 800-933-4177. Guarantee applies to PC hardware only and does not extend to software or devices not intended to run on comparable ISA or EISA systems of the same vintage. ^Source: Workgroup Technologies, ©1994 Market Model. *Prices valid in the U.S. only. Some products and promotions may not be available outside the U.S. Prices and specifications subject to change without notice. The Intel Inside and Pentium Processor logos, and Pentium are trademarks of Intel Corporation. †For a complete copy of our 3 year Limited Warranty, please write to Dell Computer Corporation, 2214 W. Braker Lane, Bldg. 3, Austin, TX 78758. Dell disclaims proprietary interest in the marks and names of others. ©1995 Dell Computer Corporation. All rights reserved.*

EMC works RAID into Symmetrix

CONTINUED FROM PAGE 1

praised the flexibility promised by EMC's mix-and-match RAID strategy. The Hopkinton, Mass., company may be the first mainframe disk vendor to offer that in one array, although Amdahl Corp. and Encore Computer Corp. are jointly working on a similar product, analysts said.

"Given the choice between a box that was flexible and a box that was not, I'd take the box that was flexible," said John Marshall, team leader for capacity planning and mainframe storage at General Accident Insurance of America in Philadelphia. "You might want to fully mirror some portions of your data, but for others, you don't need that kind of protection" or the extra cost it demands, Marshall added. He now has about 500G bytes of Symmetrix capacity installed.

"You don't always need everything done the same way," agreed Bill Rasmussen, vice president of the information services department at North Pacific Insurance Co. in Portland, Ore. EMC does a good job of "trying to build what the market says it wants, and that's been pretty successful for them," he said.

However, some observers expressed wariness about the potential impact on performance from EMC's plan to use RAID Level 4 technology as the underpinning of the RAID-S offering. In RAID Level 4, the parity data used to reconstruct files after a disk crash is written to a dedicated platter, whereas the more common RAID Level 5 approach spreads the parity information across all of the drives in a drawer.

RAID Level 4 "is something I would have to look at from scratch," Marshall said. "I have no experience with that at all." He added that General Accident's interest in making use of the RAID-S capability would depend heavily on how it performed compared with mirrored configurations of Symmetrix.

Tossing the cache around

Paul Wolfstaetter, an analyst at Gartner Group, Inc. in Stamford, Conn., said RAID Level 4 "normally would have a worse write penalty" than RAID Level 5. However, he added that EMC hopes to alleviate that through its usual strategy of throwing large amounts of cache onto the Symmetrix arrays.

Dick Blaschke, vice president of mainframe product marketing at EMC, said there will be "no comparison" between mirrored Symmetrix performance and RAID-S throughput. But he claimed RAID-S "is not going to be any worse" than competing RAID Level 5 and above arrays such as IBM's Ramac and Storage Technology Corp.'s Iceberg 9200.

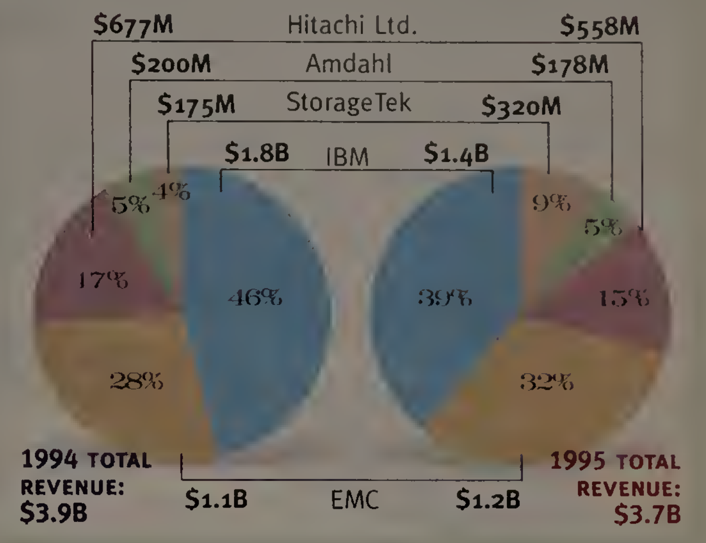
The RAID-S approach required less of an architectural change for EMC, and users will not have to rewrite data as extensively as with RAID Level 5, Blaschke said. But disks will have to be swapped out to go to RAID-S because the RAID logic will be embedded in a chip at the drive level rather than within the Symmetrix controller. That also should help minimize performance penalties, he added.

"There will be some disruption for customers, no question. But I think EMC is going to mask that disruption pretty nicely," said Carl Greiner, an analyst at Meta Group, Inc. in Stamford, Conn. He added that the mix-and-match strategy should keep Symmetrix "in the forefront" of mainframe array functionality.

RAID goes radical. See CW Guide page 77.

Closing the gap

Projected worldwide mainframe disk storage market share by revenue



Source: International Data Corp., Framingham, Mass.

An army of RAID

Next Tuesday will be a busy day for mainframe RAID array watchers. Sources said Hitachi Data Systems Corp. plans to introduce a promised RAID Level 5 subsystem on Feb. 7, a date that was already penciled in for Storage Technology to unveil details on its upcoming Kodiak array.

But users should not expect to see either very soon. Analysts said both products are expected to ship in the third quarter, the same time that EMC's RAID-S implementation is supposed to hit the market. HDS would not comment, while StorageTek said only that it expects to deliver Kodiak to an initial beta site this quarter.

Kodiak is expected to reach capacities of a terabyte and act as a more general-purpose alternative to StorageTek's Iceberg 9200 array, sources said. Meanwhile, HDS' product should be in the 750G-byte range, with performance similar to that of EMC's Symmetrix arrays, they added.

"Hitachi has been trying to push outdated 3390 technology against EMC for over a year, and they've clearly lost," falling behind upstart EMC in market share, said David Vellante, an analyst at International Data Corp. in Framingham, Mass. But the new product "clearly puts Hitachi right back in the ball game," he added.

When it ships, that is. George Sekeley, president of the information systems unit at CSX Corp. in Richmond, Va., said HDS must also get more aggressive on pricing. "They have fabulous gear, but they just haven't been able to come with the right price for me," he said. —*Craig Stedman*

NT Server

CONTINUED FROM PAGE 1

cal company. "It gives me another powerful server platform option, and it means I'm no longer relegated to Intel Corp.-based processors."

Hankering for power

Bob Sakakeeny, an analyst at Aberdeen Group in Boston, agreed, noting that many of the businesses he has spoken with recently are eager to install more powerful processors.

"Users who are currently running NT Server 3.5 on a Silicon Graphics, Inc. Mips [Technologies] machine or a Digital Equipment Corp. Alpha processor are drooling over the performance. NT Server is a screamer on these boxes, and users can expect the same type of performance boost with the PowerPC platform," Sakakeeny said.

"This type of power is the reason that NT Server 3.5 is winning against OS/2 as an application and database server and is starting to eat into departmental-level Unix machines as well," Sakakeeny added.

The upcoming support for the PowerPC platform now leaves Hewlett-Packard Co. with the lone high-end processor not supported by NT Server, Sakakeeny said.

Besides the new features, the NT Server 3.51 upgrade will also remove the current limitation that allows applications to cache only 256M bytes of memory per transaction, Nash said.

The 256M-byte cache limitation could become a problem for users with very large database applications.

"It's not a huge architectural problem," Nash said. "In NT Server 3.51, Microsoft will increase the work set [or currently mapped virtual address space] limit from the current 256M bytes to 2G bytes. This will allow customers to run applications utilizing the full 2G bytes of address space in the working set."

Some NT Server 3.5 users such as Jim Snively, systems consultant at Sun Company, Inc. in Philadelphia, said they had not come up against the 256M-byte caching limitation.

"Overall, I've been very pleased with NT Server and haven't run into any performance problems or issues," Snively said.

Not perfect

Snively and Dugger did say there were a few outstanding "wish list" features they would like Microsoft to incorporate in future NT Server releases. For instance, they said they would like automatic disk quota functionality and a utility that would clean up disks in the aftermath of a virus.

"I'd love to see automatic disk quotas as a preventive measure that blocks users from storing files before, and not after, we run out of disk space. Right now, if we run out of disk space, we have to manually go back and clean things up," Snively said.

Sources close to Microsoft said the company has no plans to produce disk quotas and will rely on third-party support to deliver this functionality.

DOS is everywhere in Windows 95. See page 42.

NT Server 3.51 to sport support

The next release of Windows NT Server 3.51 will incorporate support for the following:

- The IBM PowerPC platform, although it will not support a hot-plug capability.
- Windows 95 common controls and help desk support interfaces that will make NT applications look like Windows 95 applications.
- File compression for Windows NT File Services.
- Increased performance and multithreading capabilities for Object Linking and Embedding and Win Sockets applications.
- New video drivers for Compaq Computer Corp.'s Qvision 2000, Tseng Labs, Inc.'s W32s and Matrox Electronics Systems Ltd.'s MGA/Impression Plus video cards.

—*Laura DiDio*

INDUSTRY PULSE: Object technologies

Save time and gain productivity

Users will move to object technology faster once industry standards are adopted and commercial tools and class libraries become more widely available

Reasons to move to object technology

36%	Improve programmer productivity
33%	Reduce time to market
31%	Enchance software quality
28%	Increase software reuse
24%	Reduce maintenance costs
16%	Save in software costs
13%	Increase user productivity

Base: 404 object technology users (multiple responses allowed)

Object-oriented applications currently in use

42%	Information retrieval
33%	Transaction processing
30%	Decision support
28%	Groupware
26%	Scientific/Engineering
25%	Modeling
18%	Process Control

Base: 236 object technology users (multiple responses allowed)

Source: Market Perspective, Inc.'s 1994 Object World San Francisco Survey

Worldwide object-oriented tools revenue

	1993	1994*	1995*	1996*	1997*	1998*
Object databases	$76M	$144M	$269M	$491M	$885M	$1.4B
Analysis & design tools	$38M	$63M	$100M	$151M	$215M	$290M
Programming tools	$319M	$449M	$624M	$887M	$1.3B	$2.2B

Source: International Data Corp., Framingham, Mass.

*Projected

Objects in action

Object-oriented programming provides higher productivity, reliability and availability, but it faces a high learning curve

Productivity improvement with Smalltalk object programming:

	Original task	With Smalltalk
Development time	19 months	3.5 months
Labor months	152	10.4
Lines of code	265,000 lines of PL/1	22,000 lines of Smalltalk

Object databases are used mainly in technical applications, but they are attracting attention in the insurance industry and IS departments

Use an object database for an application if:

- The application has complex data structures and data types
- There are many relationships between data structures
- The relationships are as important as the data
- High performance is required for data manipulation
- Behavior modeling is as important as data modeling

Source: International Data Corp., Framingham, Mass.

How to contact *Computerworld* editors:

	PHONE:	FAX:
Main office, Framingham, Mass.	(508) 879-0700	(508) 875-8931
24-hour tip line	(508) 820-8555	
Mid-Atlantic bureau, Rochelle Park, N.J.	(201) 587-0090	(201) 712-1808
Washington bureau, Washington	(202) 347-0134	(202) 347-2365
Midwest bureau, Des Plaines, Ill.	(708) 827-4433	(708) 827-9159
West Coast bureau, Burlingame, Calif.	(415) 347-0555	(415) 347-6831
Northwest bureau, Bellevue, Wash.	(206) 641-7770	(206) 747-1021

ELECTRONIC MAIL: *Computerworld*'s writers and editors have individual **MCI Mail** accounts. Most of our staff members can be reached on MCI Mail by addressing messages to their first and last names as they appear on the masthead, which is opposite the editorial page. For a complete list of editorial MCI Mail addresses, message Linda Gorgone at 597-8014.

Our **CompuServe** account number is 76537,2413. Please use that account only for communications with writers and editors. Computerworld cannot guarantee response to all inquiries. Direct subscription inquiries to CompuServe: 73373,1230.

Letters to the editor and other editorial-related messages can be sent via **Internet** to letters@cw.com

CLIENT/SERVER JOURNAL: Contact Editor Alan Alper at (508) 820-8115 or via Internet at aalper@cw.com

SUBSCRIPTIONS: Inquiries and changes of address should be sent to P.O. Box 2043, Marion, Ohio 43305-2403 or call (800) 669-1002.

REPRINTS: Contact Sharon Bryant at (508) 820-8125.

RAPID REFERENCE CLIPPING SERVICE: (800) 343-6474 x554.

Inside Lines

Warped minds want to know

OS/2 has only been married to IBM's other software operations for three weeks, but already it is making them change their errant ways. Just last fall, the CICS folks at IBM promised that a Windows NT version of the transaction monitor would be introduced in early 1995 as an alternative to CICS for OS/2. The NT product does, in fact, exist, but IBM no longer plans to make a public fuss about it, CICS officials said. "You're clearly going to see IBM software operations working in a more coordinated way," said CICS strategy manager Geoff Sharman.

This Tiger ain't burnin' so bright

Microsoft finally began its long-awaited Seattle-area tests of its "Tiger" Media Server, but don't expect to be ordering pizza and Supersonics tickets over your TV any time soon. The test, which began six months late, is in only about five homes. At that rate, yours will be installed sometime in the next century. So for now, better let your fingers do the walking. Can you say "interactive television," children?

Powwow in 100VG-land

Proponents of 100VG-AnyLAN are hosting a forum today in San Francisco to drum up support for the fledgling 100M bit/sec. networking technology, which faces fierce competition from "fast" Ethernet and low-speed ATM technology. Reports that IBM's love for 100VG-AnyLan is waning are not helping matters. Several analysts report that behind closed doors, Big Blue — one of the first companies to jump on the 100VG bandwagon — is pushing its own 25M bit/sec. ATM over 100VG-AnyLAN. IBM denies this, however.

This New Era needs some character

Informix will succumb to customer demand for a character-based version of its spiffy new development tool, New Era, according to a user group leader who was briefed by the company. Informix officials plan to surprise the sales staff with the news this week at an annual companywide meeting in Nashville. Sales reps "have been pretty beaten up about this issue" by users, the group leader said.

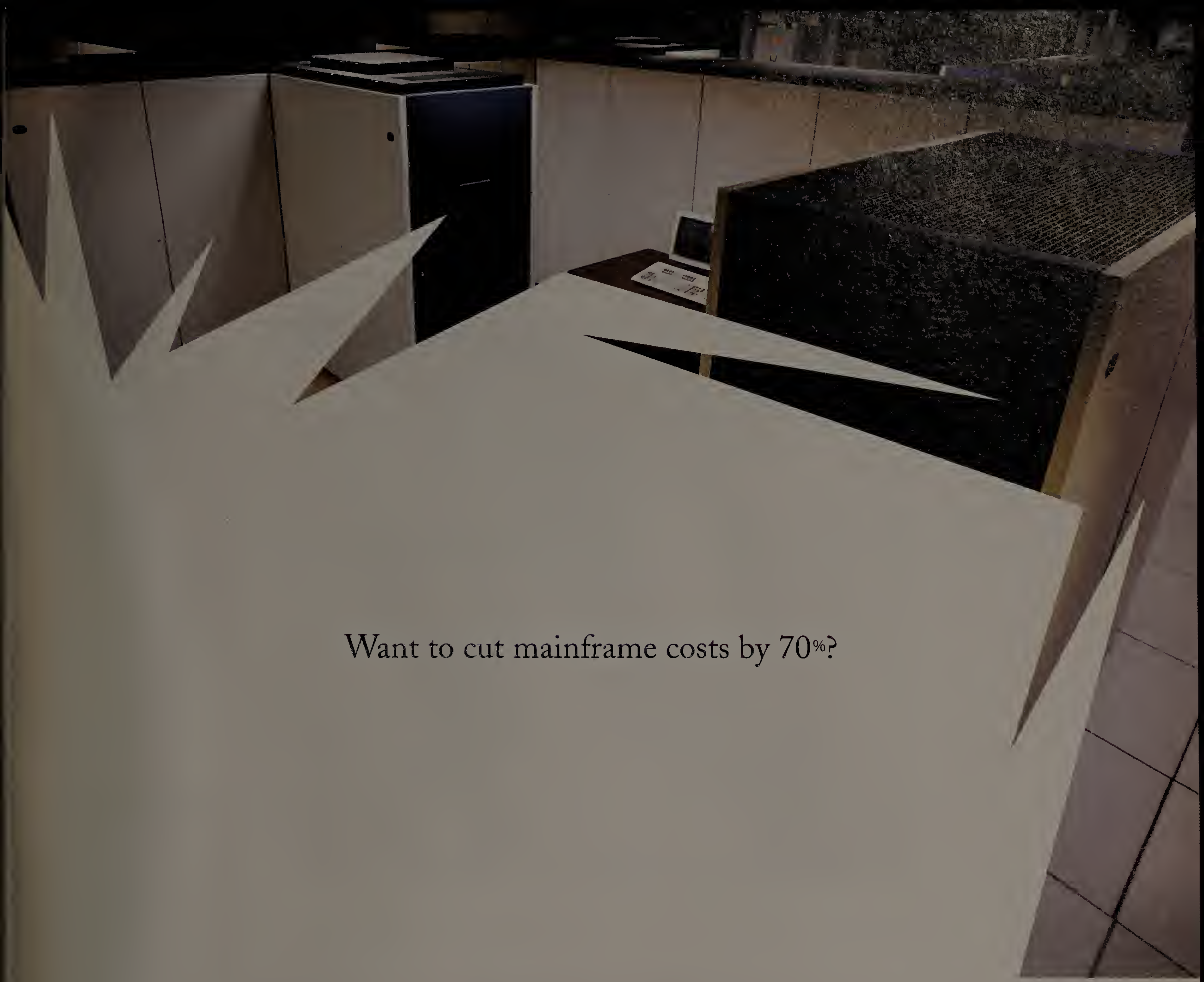
Clueless in the parallel universe

Users might be able to take advantage of a bit of confusion surrounding IBM's new parallel, clustered CMOS hardware systems. The architecture has thrown some people for a loop when negotiating contracts for software to run on the big machines. IBM's so-called sysplex design can split processing among a cluster of computers, which can make it difficult to determine how much vendors should charge for packages for the platform. One contract negotiator at a large mainframe software vendor admitted last week, "We have no clue how to price that at all."

About that fine print . . .

Computer Associates is ready to take its relationship with Hewlett-Packard a step further, but sources say HP wants to smooth out some rough spots in the contract language first. Apparently, the pair were poised to announce a deal in which they'd cross-sell and coordinate development of their systems and network management packages. Under the deal, CA-Unicenter would be even more closely integrated with HP's OpenView package — the better to manage CA's Ingres database environment, for example. But HP is balking over product positioning concerns, sources close to CA said. Officials at both vendors declined to comment.

Sick and tired of hearing about the I-way, infobahn and National Information Infrastructure? So are members of the Boston Users Group, who took a poll and came up with what they consider a preferable alternative. Their choice: "Shirley." Go figure. In the meantime, feel free to come up with news tips or tidbits for Computerworld *and then call our 24-hour voice-mail tip line at (508) 820-8555 or our toll-free number at (800) 343-6474. News Editor Maryfran Johnson can be reached by phone at (508) 820-8179, via the Internet at mjohnson@cw.com or through MCI Mail at 590-8017.*



Want to cut mainframe costs by 70%?

A few years ago, you had to run your CICS applications on the mainframe. You had no choice in the matter.

Today, you do. And what a choice it is.

UniKix is a high performance solution that lets you easily and cost efficiently port your production CICS programs to an open UNIX* environment.

How high? UniKix is exponentially faster than the nearest CICS-API UNIX competitive product.

How easily? One company ported over 300 CICS programs from their mainframe to UNIX in two weeks. Without changing a single line of code.

How cost efficiently? Studies show companies reducing costs by up to 70% while protecting their past investments.

In fact, in the last two years, over 60,000 programs have been moved to UNIX using UniKix.

Let UniKix show you how we can reduce expenses without giving up support by moving your CICS solutions to a better environment. To see how UniKix can cut costs for you, call for your FREE Migration Evaluation Kit at **1-800-765-2826**.

I'm ready to cut.

SEND ME MY MIGRATION EVALUATION KIT.

Name ______ Title ______

Company ______

Address ______

City ______ State ______ Zip ______

Phone ______ Fax ______

UniKix TECHNOLOGIES

700 Technology Park Drive, Billerica, Massachusetts 01821-4199 1-800-765-2865

*UniKix Technologies is a division of Bull. UniKix is a trademark of UniKix Technologies. *UNIX is a registered trademark of UNIX Systems Laboratories, Inc. © 1995*

IMAGINE YOUR CLIENT/SERVER SOFTWARE IS THE PARACHUTE. NOW IMAGINE JUMPING 250,000 TIMES A DAY.

INTRODUCING ELLIPSE.

RELIABILITY YOU CAN BET YOUR BUSINESS ON.

Trusting your most important applications to client/server is a big step—Ellipse makes it a safe one. It's the only client/server tool that combines rapid development of Windows™ applications with the reliability, scalability, and manageability needed for transaction-intensive applications. With features like built-in recovery and restart, Ellipse ensures that your users, and your critical data, won't be left hanging. And because Ellipse insulates development from physical deployment, and automatically partitions applications between client and server, your systems scale up easily over time. In short, Ellipse helps you build, deploy, and manage the applications that run your business. Call 1-800-BACHMAN today, and make the jump to reliable client/server.

BACHMAN